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						<input type="checkbox"/> Other <input type="checkbox"/> Amendment Number:				
Contract Number EP-C-12-021			Contract Period 09/26/2012 To 09/25/2013 Base <input checked="" type="checkbox"/> Option Period Number			Title of Work Assignment/SF Site Name Peer Review of Mussel Document				
Contractor EASTERN RESEARCH GROUP, INC.					Specify Section and paragraph of Contract SOW See PWS					
Purpose: <input checked="" type="checkbox"/> Work Assignment <input type="checkbox"/> Work Assignment Close-Out <input type="checkbox"/> Work Assignment Amendment <input type="checkbox"/> Incremental Funding <input type="checkbox"/> Work Plan Approval						Period of Performance From 01/15/2013 To 09/25/2013				
Comments:										
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Note: To report additional accounting and appropriations data use EPA Form 1900-69A.										
SFO (Max 2) <input type="checkbox"/>										
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1										
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Authorized Work Assignment Ceiling										
Contract Period:		Cost/Fee:			LOE:					
09/26/2012 To 09/25/2013										
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Work Plan / Cost Estimate Approvals										
Contractor WP Dated:				Cost/Fee:			LOE:			
Cumulative Approved:				Cost/Fee:			LOE:			
Work Assignment Manager Name Trish Rider <div style="display: flex; justify-content: space-between;"> <div>_____ (Signature)</div> <div>_____ (Date)</div> </div>							Branch/Mail Code: Phone Number 202-564-0745 FAX Number:			
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Other Agency Official Name <div style="display: flex; justify-content: space-between;"> <div>_____ (Signature)</div> <div>_____ (Date)</div> </div>							Branch/Mail Code: Phone Number: FAX Number:			
Contracting Official Name Brad Heath <div style="display: flex; justify-content: space-between;"> <div>_____ (Signature)</div> <div>_____ (Date)</div> </div>							Branch/Mail Code: Phone Number: 513-487-2352 FAX Number:			

**PERFORMANCE WORK STATEMENT
CONTRACT EP-C-12-021
WORK ASSIGNMENT 0-42**

TITLE: Peer review of the EPA's mussel presence/absence methods document

PERIOD OF PERFORMANCE: January 15, 2013 through September 25, 2013

EPA WORK ASSIGNMENT MANAGER

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CONTRACT PERFORMANCE WORK STATEMENT: Section 3.6

BACKGROUND:

The EPA is updating its 1999 Clean Water Act § 304(a) national ambient water quality criteria recommendations for ammonia to account for the sensitivity of freshwater mussels and snails to ammonia toxicity. In December 2009, the EPA requested scientific views on its draft updated ammonia criteria recommendations, which are bifurcated based on the presence or absence of freshwater mussels. Where mussels are present, the 2009 draft criteria are more stringent than the 1999 criteria because unionid mussels are the most sensitive species in the data set. The EPA's 1999 criteria did not include data for sensitive freshwater mussels. The EPA is currently in the process of revising the draft criteria based on the scientific views received in 2009 as well as more recent studies indicating that freshwater snails are also sensitive to ammonia toxicity.

Because mussels are the most sensitive species in the criteria data set and may not be found in all waters across the country, the EPA expects that some states may want to develop site-specific ammonia criteria using the recalculation procedure for site-specific criteria development, which is described in the EPA's *Water Quality Standards Handbook: Second Edition* (www.epa.gov/wqshandbook). The recalculation procedure describes the process by which a state can recalculate the EPA's ammonia criteria on a site-specific basis by removing the mussel data from the data set, which results in criteria with higher concentrations than the EPA's recommendations but that are still protective of the designated use of the water body. However, such a recalculation would require the state to demonstrate that mussels are not present at the site.

Where a state determines that mussels are not present in a particular water body and decides to utilize the EPA's recalculation procedure, EPA water quality standards staff will be in the position of having to decide whether the procedure the state used to determine that mussels are not present is scientifically sound.¹ However, the staff members charged with reviewing the state procedures likely do not have expertise in conducting mussel surveys. Therefore, the EPA tasked the Great Lakes Environmental Center (GLEC) to develop information on mussel survey methods to assist EPA water quality standards staff in deciding if state procedures are scientifically sound. While the document is intended for use by EPA water quality standards staff, the EPA also intends to release the final document to the public.

The draft document GLEC developed for the EPA is divided into three parts:

- Part A provides the results of several information collection requests to states and a group of mussel experts on mussel survey methods and data sources.
- Part B provides information on the mussel survey methods obtained from the information collection requests described above as well as a literature review.
- Part C provides a checklist of key elements that regional water quality standards staff should consider when deciding if a state procedure for determining mussel presence or absence is scientifically sound. The checklist was developed using the information provided in Parts A and B of the document.

Parts B and C of this draft mussel presence/absence methods document are the subject of the peer review under this work assignment.

PURPOSE:

The purpose of this work assignment is to provide support to the EPA's national water quality standards program in organizing and conducting an external peer review to address major issues associated with Parts B and C of the draft mussel presence/absence methods document. The peer review shall be organized in the form of a letter review and consistent with the EPA's *Peer Review Handbook: 3rd Edition* (<http://www.epa.gov/oamcinc1/1200015/handbook.pdf>).

Task 1: Work plan and cost estimate

The contractor shall prepare a work plan and cost estimate for the tasks in this work assignment including proposed level of effort, budget, schedule of tasks, and a timeline (with projected dates) for completion of the tasks. The contractor shall submit the work plan and cost estimate to the EPA Contracting Officer (CO), Project Officer (PO), and Work Assignment Manager (WAM) for their approval.

Deliverables: Work plan and cost estimate

Due Date: Within fifteen days after receipt of the work assignment

Task 2: Select peer reviewers

¹ State water quality standards (which include designated uses, criteria, antidegradation policies, and other general policies) are reviewed and either approved or disapproved by EPA under Clean Water Act § 303(c).

The contractor shall select three to five peer reviewers based on expertise, willingness, and availability while avoiding any real or perceived conflicts of interest. The group of reviewers as a whole should have demonstrated experience with conducting mussel surveys and demonstrated experience with water quality standards or other Clean Water Act regulatory programs. Individual reviewers should have either strong demonstrated experience in one of the areas listed above or some combination of experience in both of the areas listed above. Potential reviewers could represent entities such as academia, industry, state and local water regulatory programs, water utilities associations, and NGOs. In making the final selection of reviewers, the contractor shall consider the overall balance of the group in order to maximize the potential that all significant issues will be identified.

Before final selection of the reviewers, the contractor shall identify a group of potential reviewers and submit the list as well as their qualifications to the WAM for review. The contractor shall select the final reviewers and inform the WAM of its final selection.

The contractor shall document how conflict of interest determinations were made as well as the evaluation criteria and decisions made in selecting and not selecting reviewers. The contractor shall provide this documentation and copies of all mailings (e.g., invitation letters, consulting agreements) to the WAM.

Deliverable: List of potential reviewers

Due Date: Within twenty days after work plan approval

Deliverable: List of final reviewers

Due Date: Within seven days after the WAM's review of the list of potential reviewers

Deliverable: Documentation of conflict of interest determinations, evaluation criteria and decisions made in the selection process, and copies of all mailings

Due Date: With the draft report

Task 3: Conduct peer review

The contractor shall instruct the selected peer reviewers to begin the review and provide each peer reviewer with a copy of Parts B and C of the draft document and the technical charge questions below:

1. Does the literature review in Part B of the document accurately summarize the available information and methods for conducting unionid mussel surveys to determine their presence or absence? Please explain. If not, what information is either missing or unnecessary?
2. Where the information in Part B of the document provides an assessment of comprehensiveness or appropriateness of a particular method, technique, or study design in the context of this document's purpose, do you agree or disagree with that assessment? Please explain.

3. Does the checklist in Part C of the document encompass the appropriate elements for a non-malacologist to use in deciding whether a state's method for determining mussel presence or absence is scientifically sound? Please explain. If not, what elements would be more appropriate? In answering these questions, please keep in mind that the checklist is intended for use by EPA water quality standards staff members who likely do not have experience with mussel surveys.
4. Is there any other information (that was not addressed by the previous questions) that is missing from the document and would be helpful to include or that seems inaccurate, inappropriate, or particularly helpful? Please explain.
5. Please provide any additional comments you have on the information in this document that are not addressed by the previous questions.

The contractor shall inform the WAM of any requests from reviewers for additional supporting information and shall transmit back to the reviewers any such information that the WAM is able to provide. Each reviewer shall be informed of the need for confidentiality with regard to the release of EPA products that are stamped as "DRAFT." The peer reviewers and the contractor shall agree that the draft document shall not be provided to others who are not under contractor direction without the written approval of the WAM.

The contractor shall monitor the peer reviewers' progress to assure timely completion and update the WAM periodically on progress.

Task 4: Compile comments and draft summary report

Upon receipt of the peer review comments, the contractor shall prepare a draft report that provides a compilation of all the comments received and a synthesis of those comments to identify common themes, contradictions, range of responses, etc. The WAM will review the draft report to determine whether any clarification is necessary (e.g., EPA's uncertainties about the meaning of a particular review comment, reviewers' potential misunderstandings of EPA's questions or the purpose of the document under review) and provide any comments or questions to the contractor. At the request of the WAM, the contractor shall address any such comments or questions and submit a final report.

If requested by the WAM, the contractor shall transmit a copy of each peer reviewer's comments as soon as they are available.

Deliverable: Draft report

Due Date: Within thirty days after completion of the peer review period

Deliverable: Final report

Due Date: Within fourteen days after the WAM's request

SCHEDULE AND DELIVERABLES:

Task	Deliverables	Due Date
1	Work plan and cost estimate	In accordance with contract requirements

2	List of potential reviewers	Within 20 days after work plan approval
2	List of final reviewers	Within 7 days after WAM review of list of potential reviewers
2	Documentation of conflict of interest determinations, evaluation criteria and decisions made in the selection process, and copies of all mailings	With the draft report
4	Draft report	Within 30 days after completion of the peer review period
4	Final report	Within 14 days after the WAM's request

TRAVEL:

Any travel chargeable to this work assignment shall be allowable only in accordance with the limitation of FAR 31.205-43 and FAR 31.205-46 and must be approved by the EPA PO prior to travel taking place. No travel is anticipated for this work assignment.

NOTICE REGARDING GUIDANCE PROVIDED UNDER THIS WORK ASSIGNMENT:

Guidance is strictly limited to technical and analytical support. The contractor shall not engage in activities of an inherently governmental nature such as the following:

- (1) Formulation of EPA policy
- (2) Selection of EPA priorities
- (3) Development of EPA regulations

Should the contractor receive any instruction from an EPA staff person that the contractor ascertains to fall into any of these categories or goes beyond the scope of the contract or work assignment, the contractor shall immediately contact the CO, PO, and WAM.

PART B – Summary of Mussel Survey Methodologies

This section provides a summary of the various freshwater unionid mussel survey methodologies commonly employed by states and other entities including some of the considerations, techniques, and limitations of the various approaches. This information provides an overview for individuals without mussel survey experience and is designed to provide regional water quality standards staff a basis for evaluating the appropriateness of a given methodology for determining mussel presence or absence in water bodies of various general types.

The summary is sub-divided into discrete sections: sampling types, sampling design, sampling methods, and other considerations. The summary is followed by three “real-world” examples of methodologies that have been employed in water bodies of various sizes. In addition, each section highlights the most appropriate approach for determining freshwater unionid mussel presence or absence in water bodies of various types. The evaluation was based on the responses from the electronic survey, literature review of publicly available documents supplied by the respondents, and best professional judgment.

Mussel Sampling/Study Objective

The most important aspect of designing any mussel study/survey is careful consideration of the objectives (Dunn 2000; Strayer and Smith 2003; Wisconsin DNR 2005). The specific objectives of the study/survey help determine the appropriate sampling type and size (area to be covered), limitations of the study, and conclusions that can be derived. This summary highlights techniques that can address the following study objective: determine whether freshwater unionid mussels are present or absent in a water body. Other techniques found in the literature or provided by respondents to the electronic survey are included as a means of evaluating their appropriateness and utility in addressing the study objective.

Sampling Types/Strategies

There are four primary sampling types continuously highlighted throughout the literature and survey responses: reconnaissance/exploratory/preliminary, qualitative, semi-quantitative, and quantitative. These terms appear to be used loosely, and surveys often utilize a combination of these different sampling types to address various study objectives. These terms are provided here to convey the general scope and type of effort involved as well as to introduce the particular sampling techniques that may be used.

Reconnaissance, Exploratory, or Preliminary

This approach is a cursory search of a large area and can be used to determine relative unionid presence or absence in an area of a stream (Dunn 2000). This initial or preliminary survey is often used to determine if further study is needed or warranted. This approach can reveal valuable information (site characteristics, conditions, hazards, etc.) before a more comprehensive survey begins (Strayer and Smith 2003).

Qualitative

This type of sampling tends to be more comprehensive than preliminary surveys. This approach can be used to determine unionid species presence, richness, and density (Dunn 2000; EnviroScience, Inc. 2002). Often this approach is selected for use in a specific well-defined area for a specific length of time, called a timed-search (Angelo et al. 2007; Dunn 2000; EnviroScience, Inc. 2002; Wisconsin DNR 2005).

Semi-quantitative

This sampling type is often used to determine species composition and relative abundance of mussel assemblages (Dunn 2000; McRae et al. 2004) and might include visual and tactile searches.

Quantitative

This approach can be used to estimate freshwater unionid mussel density, relative abundance, and size distribution (Dunn 2000). This approach is the most comprehensive of the four sampling types and includes excavation of substrate (Dunn 2000; EnviroScience, Inc. 2002; Miller and Payne 1993; Smith et al. 2001).

Sampling Design

The information summarized in this section is largely based on the section titled “Sampling Design” in A Guide to Sampling Freshwater Mussel Populations (Strayer and Smith 2003). Note that virtually all of the literature and other information reviewed and summarized herein refer to the use of one of the techniques described in the book, which provides an overview of each sampling design and its limitations. Only the subset of those techniques/designs applicable to mussel presence/absence determinations is highlighted below.

The sampling design in a study plan defines “what” is to be sampled in the study. A good mussel survey will be explicit in terms of what will be sampled and in which part of the water body to effectively address the objective(s) of the study.

Informal Sampling or Haphazard Sampling

This sampling design includes searching for mussels only in those areas where the habitat looks promising, visibility is good, and access is convenient. This approach to sampling requires little planning beforehand because the areas to be sampled can be decided on site. Therefore, it is useful in preliminary surveys to determine mussel presence. This sampling design relies on the assumption that the sites selected are representative of the entire mussel population, which is not necessarily true and may create some bias. It is not useful for absence determinations, estimating population size, or relative abundance.

Simple Random Sampling

Simple random sampling design divides the spatial area of interest into non-overlapping distinct units of the same size. Then a random sample of those distinct units is surveyed for mussels. This approach may be better for mussel presence/absence determinations than haphazard sampling because it allows for estimations of sampling probabilities, which can then be used to calculate the variance of the estimate. However, this design may not be the most appropriate approach for mussel presence/absence determinations because mussels can be clumped at several spatial scales (Strayer and Smith 2003). Furthermore, partially because of clumping, it is possible with this approach to miss the mussel population present in the area and incorrectly label a water body as having no mussels. In other words, because a simple random sample does not sample the entire area, the subset of the area surveyed may not contain mussels even if the entire area does contain mussels.

Double Sampling

Double sampling is when an observer samples a number of distinct units using an approximate or informal inexpensive method (e.g., wading) and then re-survey a fraction of those units with a more precise method (e.g., SCUBA). This type of approach can be used to determine the percentage of the population that is buried compared to those at the substrate surface. This approach is more comprehensive than simple random sampling and, therefore, may be better for mussel presence/absence determinations. However, double sampling may still miss the target mussel population. As stated above, because the entire area is not surveyed, the subset of the area surveyed may not contain mussels even if the entire area does contain mussels.

Stratified Sampling

This sampling design involves dividing the sampling area into different strata, which can be defined in any number of ways. For example, the study area could be divided by depth and the cost of sampling at each depth. In this case, the more expensive SCUBA sampling method could be used in deep water while a less expensive snorkeling/wading sampling method could be used in the shallow water. The study area could also be divided into habitat regions or areas (e.g., riffles, pools, etc.) where mussels are likely to be present versus those areas where they are typically not present. In each stratum, the mussel surveyor might choose a different sampling design and sampling method. The stratified sampling approach keeps the cost of the survey low but ensures that high priority areas receive special attention.

Complete Coverage

Complete coverage may be the best approach for mussel presence/absence determinations because it is the most comprehensive approach. This sampling design surveys the entire study area. A challenge with this sampling design is that, depending on the type of sampling method, the cost of the mussel survey can be expensive. Complete coverage assumes the same sampling method will be used throughout the entire study area. In large water bodies, complete coverage may be too costly to undertake, but in smaller water bodies, this approach may be a viable option due to the lower cost of surveying smaller areas.

Sampling Methods

There are several different types of sampling methods for mussel surveys. In this section, the sampling method is defined as “how” the mussel population will be surveyed. This section is divided by rank from the least effective to the most effective technique that might be employed to sample the entire mussel population at a given site. However, while some of the less comprehensive methods may not be useful to determine mussel absence, the low cost of these techniques may warrant their use in preliminary or exploratory surveys.

Shoreline Searches

This method includes walking along the water body looking for live mussels in the water and shells on the shore (Nedea et al. 2009). This approach is safe and easy and can be useful when the water levels are low (Nedea et al. 2009). This method can include muskrat, *Ondatra zibethicus*, shell midden searches. Muskrats are capable of eating huge numbers of mussels (>1,000) and often leave the shells in neat piles (middens) along the stream bank (Strayer and Smith 2003). However, because muskrats are selective eaters, the piles are of limited use for species type and relative abundance (Dunn 2000; Strayer and Smith 2003). Other predators such as river otters, raccoons, skunks, gulls, and shorebirds eat mussels and also leave spent shells along shorelines, which can be used to infer presence.

Overall, this sampling method is the least expensive method for screening mussel presence or absence. While it may be incapable of determining true mussel absence from a water body, it can be useful in determining mussel presence. Where a shoreline search determines mussels are present, a more comprehensive (and likely more expensive) method may not be warranted depending on the objective(s) of the study.



Figure 1: Photo of a muskrat shell midden. (Photo from Nedea et al. 2009)

Brail Bars and Dredges

Brail bars and dredges are two methods that are commonly used by commercial fishermen to collect mussels. Both methods utilize boats and can provide some useful information for large rivers. A brail bar is dragged slowly by boat across the bottom of the water body. The mussels clamp down on the brail hooks and are brought up to the boat (Strayer and Smith 2003). Dredges are primarily used by commercial fishermen in marine waters. A dredge (shovel-like apparatus) is dragged by the boat and scoops up the mussel population. These devices can sample a large area in a relatively short time.

Both methods are similar in usefulness for mussel presence/absence surveys. Results of a brail bar are affected by brail hook type, substrate conditions, water temperature, time of day, turbidity, species behavior and size, and collector experience (Dunn 2000). The same area can be sampled several times under different conditions and produce different results (Dunn 2000). Dredges are not widely used to sample mussels in freshwater but have similar limitations as brail bars. Both methods are relatively inexpensive when compared to some other sampling techniques. The usefulness of these techniques is similar to that of shoreline searches because they are relatively easy methods to determine mussel presence and do not require a more comprehensive and costly survey. Most unionid mussel species do not occur in thick silt or unstable sand, and negative results from brail sampling coupled with these substrate characteristics are generally indicative of unsuitable unionid habitat (Dunn 2000).

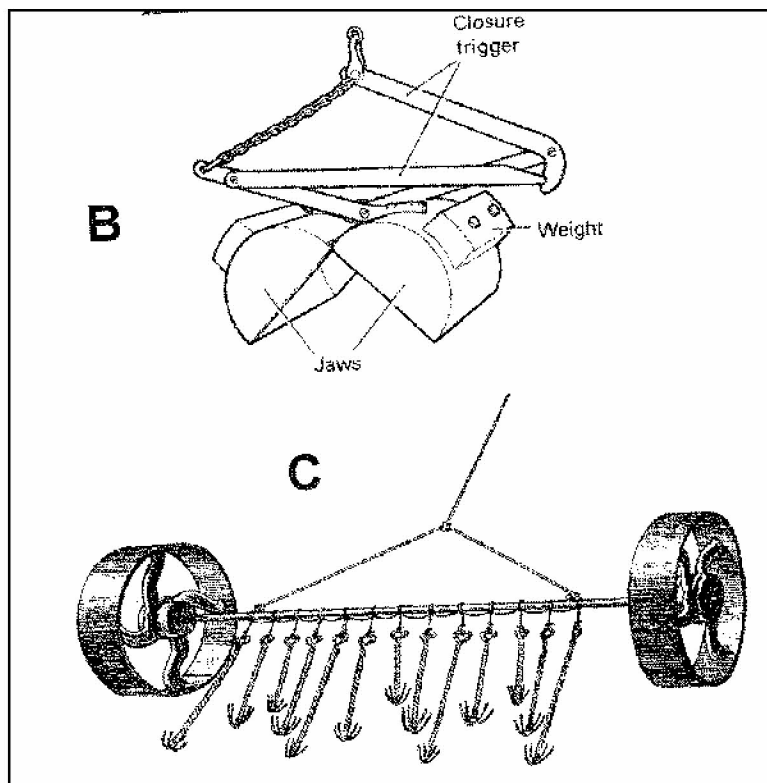


Figure 2: Example of dredge (B) and brail bar (C). (Taken from Strayer and Smith 2003)

Wading, Bucket, Aquascope Searches

This type of sampling describes a visual search for mussels that is conducted by wading in the water body and looking with eyes alone for freshwater unionid mussels. This method can be supplemented with the use of glass-bottomed buckets (aquascopes) (Dunn 2000). The surveyor places his/her head in the bucket and views the bottom of the water body through the glass bottom of the bucket, thereby eliminating the glare from the sun on the water surface (Young et al. 2001). This method can cover a lot of ground quickly (Strayer and Smith 2003).

This method is useful in shallow (<3 feet (ft)) clear water (Nedea et al. 2005) because mussels are more difficult to detect in turbid water than in clear water. This method has a high catch rate when the mussels are on the top of the substrate. However, this method is not as useful when the mussels are small or for those species that bury deep in the sediment (Strayer and Smith 2003). According to Strayer and Smith (2003), juvenile mussels are more likely to bury deeper than adults, and mussels in general are most likely to be buried during fall and winter. Additionally, a large part of the mussel population present may often be buried. Stagliano (2010) confirmed this problem with visual only searches, noting that mussels less than 30 millimeters (mm) will not be visible on the substrate surface and that visual surveys tend to be biased toward larger individuals. The Ohio River Valley Ecosystem Team (OVRET) Mollusk Subgroup assumed in their draft protocol for mussel surveys that only 50% of the mussel community is visibly present at the substrate surface (OVRET 2004). This visual limitation can be compounded by those species whose shell sculpture (shape) may make them hard to distinguish from gravel and cobble (Miller and Payne 1993).



Figure 3: Example of aquascope. (Photo from Nedea and Victoria, 2003)

Snorkeling

Snorkeling is similar to wading and the use of aquascopes except that, depending on the water body depth, some tactile techniques may also be used. A tactile search can include gently running a finger over the sediment, fanning away fine sediment, and removing loose non-embedded material (Smith et al. 2001; Strayer and Smith 2003). Snorkeling is slower than wading and aquascopes but can be used in deeper water.

Snorkeling may be a more efficient and suitable method for detecting small or cryptic mussels than wading and aquascopes because it is presumably a slower, and therefore more comprehensive, search method. However, there is no good documentation to support this statement (Strayer and Smith 2003). Snorkeling and tactile techniques may be more effective when surveying in fine-grained sediment (e.g., sand, mud) than in coarse-grained sediment (e.g., cobble) because it is easier to detect mussels tactilely than visually in the fine-grained sediment. However, snorkeling can be useful in coarse-grained sediment to visually distinguish mussels from cobble or other small rocks. Despite the advantages, snorkeling is still unable to detect all of the mussel community located deep in the substrate.

SCUBA

SCUBA is almost identical to snorkeling in its utility but can be used in deeper waters (1.0-1.5 meters (m)) (Smith et al. 2001). SCUBA is slower than snorkeling but allows the surveyor to spend more time closer to the substrate, thereby improving the opportunity and ability to detect mussels. In fact, Dunn (2000) states that SCUBA diving may be the method least biased by sampling conditions when compared to wading, brail bar, and dredge searches because of the greater amount of time the surveyor can spend closer to the substrate. While SCUBA is similar to snorkeling in terms of its effectiveness for detecting mussels, the main differences in these two methods are the depth of the water body that is being sampled and the cost of each technique, with SCUBA being significantly more expensive.

Excavation

Excavation is the most effective sampling method that is able to detect the entire mussel community. However, the method is also the most invasive. Excavation involves digging up a small amount of substrate and sieving the material to find all buried and non-buried mussels. This method is the slowest of all the methods and, therefore, usually the most costly. Substrate is usually collected by hand or trowel via wading, snorkeling, or SCUBA depending on water depth, and the material is then sieved on the shore, boat, or *in situ*.

Other Considerations

Time of Year

A number of survey responses and examples found in the literature stress the importance of only sampling from spring through early fall (April to October) (Angelo et al. 2009; OVRET 2004; Shearer et al. 2005; Sovell and Guralnick 2004; Smith et al. 2001; USFWS and VDGIF 2008; WDNR 2005). During the April to October time period, conditions are best for viewing live mussels in the substrate because river flow tends to be low with high water clarity (Smith et al. 2001). In addition, high proportions of some mussels are at the substrate surface rather than buried deep in the sediment during the summer (Amyot and Downing 1991; Balfour and Smock 1995). The Draft Freshwater Mussel Guidelines for Virginia also recommends conducting mussel surveys during the April to October time frame because during the cooler months, mussels tend to be located deeper in the substrate, which makes them more difficult to find by visual methods alone (USFWS and VDGIF 2008). In these same Guidelines, conducting surveys

outside the specified timeframe requires special approval. The Wisconsin DNR guidelines for sampling mussels note that mussels are more active from mid-June to late September and, thus, advocate that surveys be conducted during this time in Wisconsin waters (WDNR 2005).

Special Considerations for Small or Rare Species and Vertical Migration

Relatively recent research by Chris Eads and Jay Levine (2007) at North Carolina State University shows that smaller (and sometimes rare) species tend to spend less time on the sediment surface than larger species, possibly as a means to avoid predation or being swept away by the current. The research also shows that success in finding some of these smaller and rare species is increased by sampling in colder months of the year (winter and early spring surveys).

Visibility Requirements

The OVRET draft protocol (2004) identified a minimum visibility requirement of 0.5 m with or without lights at the depth of the survey. The protocol specifies that the surveyor must quantify the actual visibility. If the visibility prerequisite is not met, the survey must either be rescheduled or use a different protocol (e.g., more intensive quantitative survey).

Lifespan of Data

The OVRET draft protocol (2004) also states that survey data collected at a specific site will be considered valid for five years from the date the survey was conducted. A shorter timeframe was selected for the Draft Freshwater Mussel Guidelines for Virginia (USFWS and VDGIF 2008), where a negative survey (i.e., no mussels found) is only valid for 2 years.

Table 1 below highlights the difference in mussel presence over time for Craig Creek in Virginia and provides a real-world example illustrating why survey data conclusions should have a limited lifespan:

Table 1: Mussel survey data for Craig Creek in Virginia. (Obtained from Brian Watson, VDGIF)

	Number of Individuals Found at Craig Creek, Virginia					
Year	Elliptio complanata	Elliptio fisheriana	Fusconaia masoni (threatened)	Pluerobema collina (endangered)	Strophitus undulatus	Villosa constricta
2006	3	44	0	2	1	30
2007	0	0	0	0	0	0
2008	1	33	3	0	2	10
2009	0	14	7	2	1	8

At the site, six species were found in every year of sampling except 2007, when no mussel species were found even though they had been documented as present during the other three years using the same sampling techniques. Had a single survey been used to determine mussel absence in 2007, the present mussel population would not have been detected, which is not

indicative of the true characteristic of the water body. This example also suggests that any single mussel survey may not truly characterize the water body accurately.

Experienced Surveyors

The experience the surveyor or surveying crew has with sampling the species and habitat of interest is extremely important, especially considering that the majority of mussel sampling methods include some level of visual search. The surveyor must be able to identify by sight alone a mussel when encountered in the substrate. This ability requires a significant level of experience with mussel sampling and expert knowledge of the species habitat and life history. A report provided by EnviroScience, Inc. on the Mill Village Truss Bridge project recommended that all surveyors needed to accrue at least 10 hours of search time alongside an experienced mussel collector before they were allowed to search independently to support the survey (EnviroScience, Inc. 2002). In their report, an experienced mussel collector is defined as a biologist with at least 80 hours of search experience. Such experience is crucial because it is difficult to find small, juvenile, or cryptic mussels and distinguish them in the substrate. An experienced sampler will also be able to identify areas in the sample area that will most likely support mussel populations. In Virginia, only qualified, pre-approved mussel surveyors can conduct surveys (USFWS and VDGIF 2008). Those not pre-approved must submit their qualifications before conducting any survey.

The need for experienced mussel surveyors is also highlighted in the Freshwater Mussel Survey Protocol for the Southeastern Atlantic Slope and Northeastern Gulf Drainages in Florida and Georgia (Carlson et al. 2008). This Protocol's standard operating procedure states that surveyors must have sufficient knowledge of the mussel species likely present in the area as well as the basin they propose to survey. This knowledge includes species-specific biology and ecological requirements and the ability to identify freshwater mussels (Carlson et al. 2008). In addition to the general academic knowledge surveyors must possess, individual surveyors must also have adequate field experience, which includes documented field-time, ability to execute mussel survey methods independently, locating and identifying federally-listed species, and experience in the safe care and handling of threatened, endangered, or candidate mussels. All of this knowledge and experience must be documented, and a letter of recommendation may be requested prior to any surveys being conducted (Carlson et al. 2008).

Appropriate Permits

Surveyors must have appropriate permits from state and USFWS officials before the survey is conducted. State permits may be required because some states like Virginia are responsible for the conservation and management of all freshwater mussel species in the state. However, federal permits may be required because the FWS is responsible for the conservation and management of all federally-listed mussel species. Permits for water bodies potentially containing federally-listed species are necessary because the USFWS (and some states like Virginia) control unlawful take of threatened and endangered species. Under Section 7 of the Endangered Species Act, take is defined as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. The USFWS views mussel surveys as bothering mussel species

and, thus, falls under unlawful take. Some states like South Carolina only require a fishing permit.

A good survey will include coordination with state game and fisheries or natural resources divisions and USFWS, especially if there is potential for federally-listed species to be present in the area/watershed.

Survey Examples

Wadeable Rivers

Source: Wisconsin Department of Natural Resources. 2005. Guidelines for sampling freshwater mussels in wadable streams. Final Report No. 0092-01-09. Wisconsin Department of Transportation. Madison, Wisconsin. 57 pp.

This document provides an example of a standardized mussel sampling and reporting protocol for wadeable (<1.2 m deep) rivers and streams as well as the wadeable portions of large rivers. This protocol was developed to answer the following study questions: are mussels present, which species are present, and what is the relationship between mussel density and habitat? There are three different protocols defined in the document, one for each study objective. The protocol highlighted below pertains only to the first objective: are mussels present or absent? This protocol is designed for cases/situations when resources (e.g., time and manpower) are limited and represents a minimum effort. The protocol was developed and funded through a joint project between the Wisconsin Department of Transportation and the Wisconsin DNR. The data generated using these protocols are expected to provide a baseline of mussel distribution data in Wisconsin as part of the Wisconsin Mussel Atlas and in conjunction with DNR basin surveys.

Before any surveying/fieldwork is performed, a record search is conducted to determine if any historical or other data exist for the particular site or water basin. The information is used to develop an initial list of mussel species that may be present in the water body. Any endangered, threatened, or species of special concern should be noted as well as their general habitat preferences. Importantly, the historical data collected are only to be used to determine possible species presence and not as an indicator of species absence. Potential sources of information include previous field surveys, NHP databases, museum records, and other available literature, including the results of mussel and/or benthic macroinvertebrate surveys reported in the gray literature.

The sampling design for the presence/absence determination protocol is an informal one. Sites (station locations) are selected on the basis that they are representative of available habitat within the sampling reach and are located reasonably far enough away from permanent structures (bridges, dams, etc.) such that the structures are not likely to affect mussel distribution (unless the study objective is to evaluate those particular sites). The number of station locations should be sufficient to give adequate longitudinal coverage of the selected stream reach, with the specific locations chosen to maximize the available stream habitat and spatial resolution of mussel distribution. Caution is advised when establishing sampling stations to avoid investigator bias toward particular habitat types because mussels can often be found in unexpected habitats.

The authors note that for streams with well-developed pool riffle structures, each sampling station should be located at the base of a riffle. The authors also note that mussel species richness and density are often higher at the head and base of riffle areas and in moderate run habitat with stable mixed substrates.

Each site should be sampled for a minimum of one hour or until a maximum distance of 200 m is reached in <7 m wide streams or 300 m is reached in >7m wide streams. When tactile searches are necessary due to high turbidity, search time should be limited to one hour. When the search time limit is reached, the amount of stream distance sampled should also be noted. The authors are clear to note that the probability of detecting a mussel species during a timed search varies greatly depending upon the species, field conditions, collector experience, and length of time spent searching. Typically the largest and most visible mussels are collected while the small species, juvenile, buried, and cryptic mussels are often overlooked.

The sampling method to be utilized is a relatively rapid visual search. The search team should consist of two people equipped with a mask and snorkel. Each individual should select a shoreline and search in an upstream manner quartering back and forth towards the center of the stream beginning at each station location. Visual searches should also include a tactile (hand grabbing) component, making sure to sweep hands back and forth while sifting through substrate. The authors note that the use of waders in shallow streams may limit the observers' ability to conduct additional tactile searching. In sand flats, the use of mask and snorkel may not be necessary, especially if the substrate is clearly visible. The use of the tactile search in deeper water should be conducted randomly while progressing upstream. In this particular protocol it is noted that small streams less than 4 m wide may be conducted by only one person.

Information should be recorded from each survey including, but not limited to, the following:

- Location information – water body identification, stream name, site mile, date, collectors, county, township, GPS coordinates, nearest road/access, and site map;
- Water characteristics – time, water level, air temperature, water temperature, conductivity, turbidity, water clarity, visibility, and gradient (flow);
- Sampling strategy – sampling method, search times, area searched, bank (right/left), mussel presence, and distance to live mussels;
- Habitat description – stream widths, habitat description, macrohabitat (pools, runs, riffles, rapids, etc.), substrate (detritus, clay, silt, sand, etc.), and artificial bank structures.

Another recommendation specifically mentioned in this protocol states that surveys should only be conducted between mid-June to late September. This timeframe was selected because stream levels are near base flows, water temperatures are near maximum, and mussels are active during this period. Additionally it is recommended that an experienced malacologist design the survey and be on site at the time of sampling.

Large Area

Source: EnviroScience, Inc. 2002. Mill Village Truss Bridge replacement biological assessment/freshwater mussel population survey. Prepared for MS Consultants and Pennsylvania Department of Transportation. EnviroScience, Inc. Stow, OH. 85 pp.

This document provides an example of a mussel survey conducted by a consulting service for a specific bridge project. The goal of the survey was to determine the presence/absence and distribution of threatened or endangered species of concern and state candidate freshwater mussel species within the project area. Pennsylvania Department of Transportation contracted EnviroScience, Inc. to complete the study in response to recommendations by the USFWS under Section 7 of the Endangered Species Act and the Pennsylvania Fish and Boat Commission.

The survey protocol used for the project had already undergone peer review by an accredited national journal, was accepted by the USFWS, and had been field tested within the Allegheny Basin. The survey protocol used is designed to determine presence and density estimates for rare species over large areas.

The sampling design used in the survey was a stratified sampling design. The protocol divided the impact area into primary and secondary impact areas based on their proximity to in-stream construction impacts. Different sampling methods were used for each area. Secondary impact areas were sampled qualitatively, and primary impact areas were sampled qualitatively and quantitatively. Both the qualitative and quantitative portions of the protocol were used for

species detection, and the quantitative portion was also used for calculating population estimates.

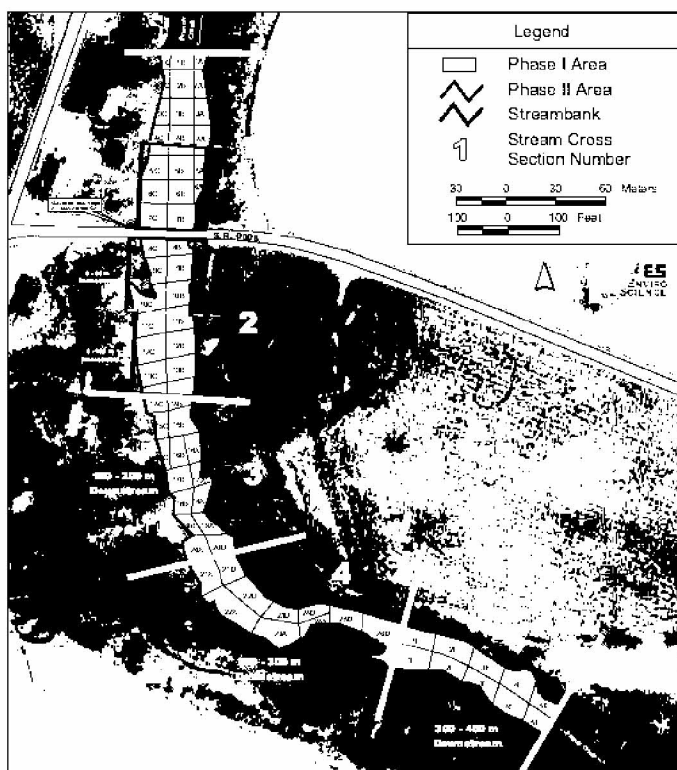


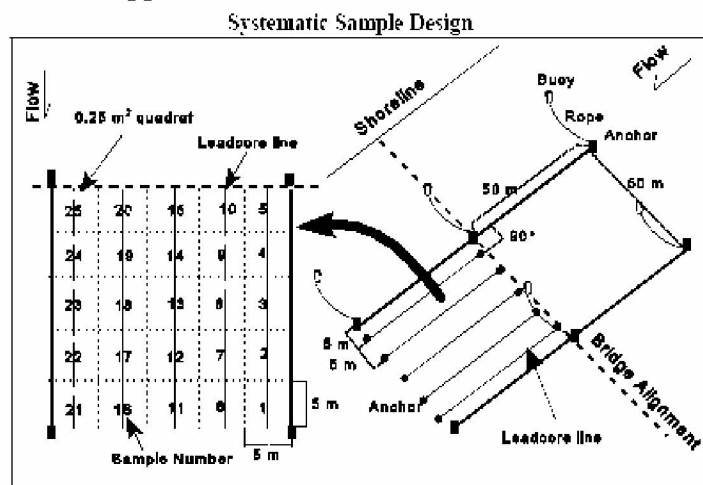
Figure 4: Pennsylvania Department of Transportation
Mill Village Truss Bridge Replacement, S.R. 0006 Section B02
Mill Village, Erie County

The qualitative surveys were completed 100 m (328 ft.) upstream of the existing bridge to 400 m (1,312 ft.) downstream, a total area of 12,118 square meters (m^2) (130,436 square feet (ft^2)). The primary impact areas were defined as 50 m (164 ft.) upstream and 100 m (328 ft.) downstream of the existing bridge, a total area of 5,250 m^2 (55,965 ft^2). The boundary limits were based in-stream impacts anticipated by the Pennsylvania Department of Transportation as well as recommendations by the USFWS.

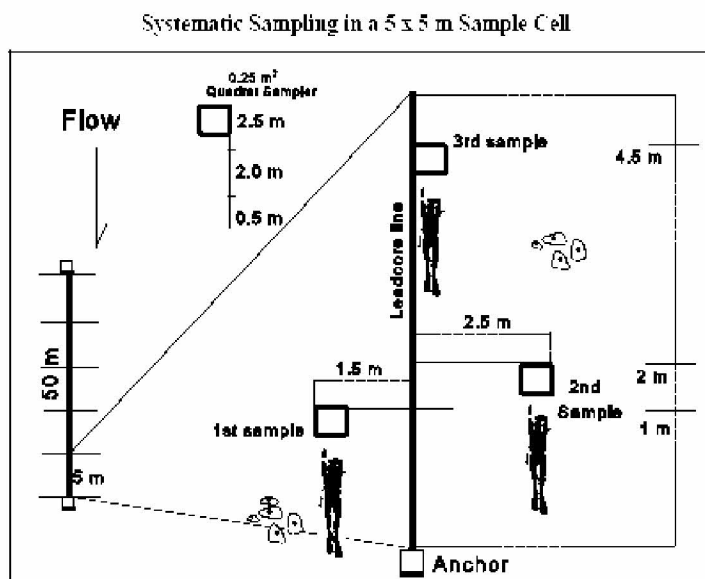
The qualitative sampling design was complete coverage with a time search limitation. The river was divided into 15 x 15 m (66 x 66 ft.) cells, except in areas where the stream width was less

than 15 m. Each cell was sampled by SCUBA or snorkeling method and was searched for thirty minutes. The target search rate for the qualitative sampling was 0.5 m² per minute, which resulted in approximately 7.5% of the cell being searched. In cells that were less than 15 x 15 m in size, the total search time was prorated. The survey notes that diver deployment, navigating around obstacles, and other non-search activities were not counted in the total search time.

Quantitative sampling consisted of a systematic random start design (Smith et al. 2001). Transect lines 50 m long were set parallel to the shore every 5 m (16 ft.) apart, resulting in a total of 21 transects. Random numbers were used to determine coordinates for three quadrat sub-samples within each sample cell. Generally, each 50 m (164 ft.) transect had 30 quadrats excavated along its length. The sampling method involved excavating the substrate in each quadrat to a depth of approximately 10 centimeters (cm) (3.9 inches (in)) by metal scoop or hardpan. Each quadrat was also visually inspected after excavation. All material collected was placed in mesh bags and taken to the field processing station (shore or boat). Samples were sorted by hand. All mussels were identified to the species level and counted, and their condition (i.e., live, fresh dead, or relic) was recorded on field data sheets. All mussel species were measured and identified by a USFWS-approved mussel taxonomist.



Shoreline, transect line, and bridge alignment are shown.



SCUBA and snorkeling dive teams worked in groups of two or three, and a maximum of three teams worked simultaneously. A surface support officer and safety boat was assigned to each SCUBA dive team. Dive teams made a consistent effort to standardize search efforts among individuals.

Surveyors needed to accrue 10 hours of search time alongside an experienced mussel collector before they were qualified to search independently. An experienced mussel collector is a biologist with at least 80 or more hours of search experience.

A muskrat midden search was conducted within the survey limits of the study to identify spent valve deposits. All such deposits were mapped and spent valves were counted.

The mussel survey was conducted in July under what was considered good

Figure 5: Various sample designs.

field conditions. Water temperature ranged from 21 to 24 °C, flow conditions were average to below normal, and water visibility varied from 0.5 to 1.5 m (1.6-4.9 ft.). River depths varied from 0.1 m to 2.1 m (0.3 to 7 ft.). All sampling was conducted by moving upstream, so visibility in non-searched areas would not be impacted.

The qualitative survey found 21 live unionid species, and although the quantitative survey found one additional species, only 19 of the total 22 live unionid species were found using the quantitative method. While most cells had mussels present (89.5%), mussels were not detected in partial cells located near the shoreline in marginal habitats or in areas with unstable substrates.

Large River

Source: Ohio River Valley Ecosystem Team Mollusk Subgroup (ORVET). 2004. Draft protocol for mussel surveys in the Ohio River where dredging/disposal/development activity is proposed.

This unpublished draft protocol provides basic mussel survey methodology and guidance for a consistent approach to conducting mussel surveys throughout the Ohio River. The goal or objective of the draft mussel survey protocol is to identify mussel concentrations and avoid those areas in dredging and/or spoil disposal activities. Note that this level of survey effort is **not sufficient to prove the absence of a federally-listed species**. Also note that this draft protocol has not been adequately field tested and, therefore, is subject to change or modification.

The sampling design in this draft protocol is similar to a simple random sample with a few constraints and extra requirements. In this protocol, transects are established perpendicular to the river. Each transect can be no further than 100 m apart, with a minimum of three transects spanning the proposed dredge/fill site. Each transect is then subdivided into 10 m long by 1m wide segments. If no mussels are observed in two adjacent transects wherein at least one transect suitable habitat is found, an additional 10 minute search is to be conducted in the area of suitable habitat. If any live and/or fresh dead mussels are found between the two transects during the additional search, an additional transect will be placed there and searched accordingly.

The sampling method is a SCUBA-based timed search. The observer uses a visual search combined with a tactile search including moving cobble and woody debris, hand sweeping silt and small detritus, and probing/disturbing the upper 1-2 inches of surface substrate. A minimum of five minutes of search time is conducted in each segment. Collected mussels are bagged for processing and habitat conditions are noted where mussels were found. In this protocol, the assumption is that 50% of all mussels are visibly present at the substrate surface.

There are a number of other considerations noted in the draft protocol. Surveying can only occur from May 1st to October 31st. Any other time frame must be pre-approved and may require another survey protocol. A minimum visibility requirement is also in place. Visibility must be at least 0.5 m (approximately 20 in.) with or without lights at the depth of the survey. The survey must note the actual visibility on the day of the survey, rather than just indicating that the minimum requirement was met. If the visibility does not meet the requirement, the survey is either re-scheduled or performed using a more-exhaustive sampling method.

Presence in this protocol is defined as a mussel concentration of one live mussel per square meter. Also, the presence of just one live or fresh dead federally-listed species will constitute a mussel concentration requiring protection.

The data requirements for the protocol include the following and are to be recorded on a standard data sheet: persons collecting information, diver(s) and mussel identifier, surface weather conditions, air and water temperature, visibility (see aforementioned visibility requirements), collecting time, river location, GPS coordinates of ends of dive transects, substrate information (use Wentworth size scale to determine percent silt, sand, gravel, cobble, boulder, bedrock, scoured substrate, etc.), relative compaction of the sand and gravel substrate, an estimate of the percent zebra mussel coverage of the substrate, and identification of mussels, both live and dead, to the species level.

This protocol also advocates the need for including buffer zones for dredge/fill/disposal activities when mussel concentrations are found. The recommended buffer zone is 1,500 ft. upstream, 500 ft. downstream, and 500 ft. adjacent to a mussel concentration.

PART C - Checklist of Survey Elements

This section provides a simple checklist of key elements that should be considered for evaluating the scientific soundness of a proposed survey methodology for determining freshwater mussel presence or absence. The checklist was developed using the information presented in Parts A and B of this document. Most of the elements in the checklist apply to water bodies of all types.

Included with the checklist is a sample field survey form from the Freshwater Mussel Survey Protocol for the Southeastern Atlantic Slope and Northeastern Gulf Drainages in Florida and Georgia (Carlson et al. 2008). The field survey form contains many of the key elements in the checklist and has been included to supplement the information provided in the checklist.

Following the checklist and field survey form is a brief synopsis of a real-world example/case study in which some of the recommendations made herein were used inappropriately, which resulted in a faulty conclusion that, left without correction, could have led to an erroneous regulatory decision.

Checklist of Key Elements

Preliminary Information

- ☐ Is the surveyor/contractor qualified to survey the geographic area, water body type, and potential mussel fauna of the region (i.e., has the surveyor/contractor been pre-approved to conduct mussel surveys in the region/state? Did he/she provide adequate credentials/certifications, including number of hours worked or trained, etc.)?
- ☐ Is the objective of the survey clearly stated?
- ☐ Does the water body or watershed/region of interest contain, or did it ever contain (via historical records, other survey data, etc.), any unionid mussel species?
- ☐ Does the surveyor/contractor have all appropriate state and federal permits (e.g., in the case of a rare species being found)?
- ☐ Has a thorough study plan been developed?
- ☐ Has the study plan been prepared in cooperation with, reviewed, or approved by a state natural resources or federal Fish and Wildlife Service official?

Study Design

- ☐ Is the study area thoroughly delineated (i.e., has a map been created showing all aspects of relevance within the area of interest such as study boundaries, vertical and horizontal in stream demarcations, quadrats/cells to be sampled, etc.)?
- ☐ Is the study area thoroughly described (see following field survey form, i.e., coordinates of

location, qualitative and quantitative in stream features, water quality, channel stability, impoundments, riparian features, road crossings, and other unique natural and anthropogenic features)?

- ☐ Is the survey method thoroughly described and appropriate for the water body and potential mussel fauna present (see Part B of this document - Survey Examples)?
- ☐ Does the method include more than one surveyor, and if so, are names provided with indication of level of training or experience?
- ☐ Will any state or federal officials be present during sampling?
- ☐ Do the proposed sampling date(s) fall within the recommended timeframe for the region and mussel fauna potentially present, e.g., April to October (or other timeframe based on current research information – see Eads and Levine 2007)?

Reporting

- ☐ Will a final report be prepared containing author contact information, objective(s), and a thorough description of methods, survey results/finding, and conclusions?
- ☐ Will all forms/field data sheets be made readily available upon request for quality review?
- ☐ Has a provision for continued monitoring of the site/stretch of stream been included in the study plan if results are negative (i.e., results indicate mussel absence)? If so, does the provision stipulate return frequency and method?
- ☐ In case of a positive finding (i.e., presence of freshwater mussels), is a provision included for documentation with the proper authorities and archive (i.e., US Fish and Wildlife Service, State Natural Heritage Program/authority, other interested parties such as academic institutions)?

Example Field Survey Form

(Obtained from the Freshwater Mussel Survey Protocol for the Southeastern Atlantic Slope and Northeastern Gulf Drainages in Florida and Georgia – Carlson et al. 2008)

Site Number:		Field Number:		Time Beg:		Date:	
Watershed/Drainage:				End:		State:	
Waterbody:				Latitude:		Long:	
Location:				Stream Order:		Stream Type:	
Gage Station:				Surveyor(s):			

Determining PSA	Distance upstream:	Survey Technique	Tactile Only <input type="checkbox"/> Tactile With Snorkel <input type="checkbox"/>	
	Distance downstream:		Tactile With SCUBA <input type="checkbox"/>	

Instream Features Quantitative			Water Quality		
<i>Please specify all units of measurement</i> % Canopy Cover: _____ Wetted Width: _____ Surface Velocity (at thalweg): _____ Water Depth (at thalweg): _____ Bank Height (rt/lr): _____ Bank Angle (rt/lr): _____			Water Temp: _____ °C Dissolved Oxygen: _____ mg/L Conductivity _____ pH _____ Other: _____ 303d Listed: <input type="checkbox"/> yes <input type="checkbox"/> no		Water Clarity <input type="checkbox"/> Clear <input type="checkbox"/> Slightly turbid <input type="checkbox"/> Turbid <input type="checkbox"/> Opaque
Instream Features Qualitative			Designated Use:		
Channel Alteration: <input type="checkbox"/> No <input type="checkbox"/> Yes Describe: _____ Shoring Structures: <input type="checkbox"/> None <input type="checkbox"/> Limerock <input type="checkbox"/> Gabion <input type="checkbox"/> Concrete <input type="checkbox"/> Rip-rap <input type="checkbox"/> Other: _____ Extent: _____ Substrate composition (% est.): Gravel _____ Silt _____ Clay _____ Clay Marl _____ Fine sand _____ Coarse s. _____ Medium s. _____ Boulder _____ Bedrock _____ Cobble _____			Violated Criteria: _____ Heavy Rain in past 7 days: Yes <input type="checkbox"/> No <input type="checkbox"/> Air Temperature: _____ Est. <input type="checkbox"/> Act. <input type="checkbox"/> Survey Weather Conditions: Scattered showers <input type="checkbox"/> Heavy rain <input type="checkbox"/> Clear/sunny <input type="checkbox"/> Steady rain <input type="checkbox"/> % Cloud cover _____		

Channel Stability (Check one box for each column):				Impoundments:	
Deposition/Aggradation		Incision/Degradation		<input type="checkbox"/> None <input type="checkbox"/> yes (Describe):	
Excellent	Large, fresh deposits <i>absent</i> High number of deep pools	No mass-wasting or significant erosion of banks Channel slightly entrenched <input type="checkbox"/> High number of deep pools		Fish Passage:	Fish Presence:
Good	Large, fresh deposits <i>uncommon</i> Moderate number of deep pools	Some bank erosion apparent, no mass wasting Channel slightly-moderately entrenched <input type="checkbox"/> Moderate number of deep pools		<input type="checkbox"/> yes <input type="checkbox"/> no Describe:	<input type="checkbox"/> Absent <input type="checkbox"/> Rare <input type="checkbox"/> Common <input type="checkbox"/> Abundant
Fair	Large, fresh deposits <i>common</i> Low-moderate number of deep pools	Active bank erosion, potential mass-wasting Channel moderately-highly entrenched <input type="checkbox"/> Low-moderate number of deep pools			
Poor	Large, fresh deposits <i>very common</i> Few, if any, deep pools	Active bank erosion, frequent mass-wasting Channel moderately-highly entrenched <input type="checkbox"/> Few, if any, deep pools		Woody Material: <input type="checkbox"/> None/infreq. <input type="checkbox"/> Moderate <input type="checkbox"/> Extensive	

Riparian Features Quantitative				Site Road Crossing																																			
Rt* Buffer width(ft): <input type="checkbox"/> 10-25 <input type="checkbox"/> 25-75 <input type="checkbox"/> 78-150 <input type="checkbox"/> 150+		Landuse Characterization: (100 feet to either side of the stream) <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td></td> <td style="text-align: center;">Rt Bk</td> <td style="text-align: center;">Lt Bk</td> <td></td> </tr> <tr> <td>Natural Forest</td> <td></td> <td></td> <td>%</td> </tr> <tr> <td>Silviculture</td> <td></td> <td></td> <td>%</td> </tr> <tr> <td>Pasture</td> <td></td> <td></td> <td>%</td> </tr> <tr> <td>Agricultural</td> <td></td> <td></td> <td>%</td> </tr> <tr> <td>Residential</td> <td></td> <td></td> <td>%</td> </tr> <tr> <td>Commercial</td> <td></td> <td></td> <td>%</td> </tr> <tr> <td>Industrial</td> <td></td> <td></td> <td>%</td> </tr> </table>			Rt Bk	Lt Bk		Natural Forest			%	Silviculture			%	Pasture			%	Agricultural			%	Residential			%	Commercial			%	Industrial			%	Road Type: <input type="checkbox"/> Paved <input type="checkbox"/> Unpaved Name (if known): _____		Crossing Type: <input type="checkbox"/> Pipe culvert <input type="checkbox"/> Box culvert <input type="checkbox"/> Bridge <input type="checkbox"/> Paved box culvert	
	Rt Bk	Lt Bk																																					
Natural Forest			%																																				
Silviculture			%																																				
Pasture			%																																				
Agricultural			%																																				
Residential			%																																				
Commercial			%																																				
Industrial			%																																				
Lt* Buffer width(ft): <input type="checkbox"/> 10-25 <input type="checkbox"/> 25-75 <input type="checkbox"/> 78-150 <input type="checkbox"/> 150+				Riparian Features Qual.		Local Non-Point Source Pollution Potential: <input type="checkbox"/> No evidence <input type="checkbox"/> Slight <input type="checkbox"/> Moderate potential <input type="checkbox"/> Obvious sources <input type="checkbox"/> Livestock access Describe: _____																																	
Notes				Floodplain Access:																																			
				<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td></td> <td style="text-align: center;">Rt*</td> <td style="text-align: center;">Lt*</td> </tr> <tr> <td>None</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>Partial</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>Full</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> </table>			Rt*	Lt*	None	<input type="checkbox"/>	<input type="checkbox"/>	Partial	<input type="checkbox"/>	<input type="checkbox"/>	Full	<input type="checkbox"/>	<input type="checkbox"/>	Bank Erosion: <input type="checkbox"/> Non-eroding <input type="checkbox"/> Active Erosion <input type="checkbox"/> Mass-wasting																					
					Rt*	Lt*																																	
				None	<input type="checkbox"/>	<input type="checkbox"/>																																	
Partial	<input type="checkbox"/>	<input type="checkbox"/>																																					
Full	<input type="checkbox"/>	<input type="checkbox"/>																																					

Real-world Example/Case Study

The following case study was provided to EPA courtesy of the South Carolina Ecological Services Field Office of USFWS. All information is public record, but names have been excluded here.

<u>Project Description:</u>		
An initial mussel survey was performed as part of a 404/401 permitting process for a proposed Walmart shopping center to be developed adjacent to US 521 in northern Lancaster County, South Carolina. The proposed development required the relocation of an onsite stream (Walton's Creek, a.k.a., Landfill Creek), which is a tributary to Six Mile Creek. Because the federally endangered Carolina heelsplitter (<i>Lasmigona decorata</i>) is known to occur within the Catawba River Basin in Lancaster County, a mussel survey was required to: 1) determine presence of <i>L. decorata</i> in Twelve Mile Creek, Six Mile Creek, and the tributary to Six Mile Creek (i.e., Walton's Creek), and 2) identify potential effects to the species from the construction project.		
<u>Survey Design:</u>		
Design Parameter	Initial Agent Contractor Survey	Follow-up Contractor Survey
Date(s) Surveyed:	2005 (single visit?)	March-April 2006 (three visits)
Area covered:	Entire length of Walton's Creek below US 521, all of Six Mile Creek below the confluence with Walton's Creek, and Twelve Mile Creek in the vicinity of the confluence with Six Mile Creek	Similar, with some additional stream segments
Number Surveying	Single individual (assumed)	Two-man teams (USFWS present on two of three visits)
Method(s):	Visual without other aid and tactile via hand-raking 1 inch below surface substrate	Visual with bathyscope/aquascope and tactile methodologies. Timed searches employed in each reach to generate a CPUE and #/person hour for each species (survey time in person hours ranged from 1 to 28 depending on stream segment)
Habitat of 1° focus:	Sandy-silt areas	All (riffle, run, pool, slack-water, etc.)
Mussel collection:	On site and transported to laboratory for identification	Not applicable
Species identification:	Tentative using literature references; unknowns via assistance of an outside expert	On site
<u>Results and Findings:</u>		
The preliminary survey reported no mussels found in Walton's Creek or in Twelve Mile Creek and limited numbers and species in Six Mile Creek. The contractor concluded that, due to pollution problems, the Carolina heelsplitter was not likely to be found in Six Mile Creek, and therefore, the construction project would not impact the species.		
Upon obtaining the results of the initial survey, representatives of the USFWS expressed concerns relating to the contractor's experience handling mussels as well as whether the contractor possessed a federal permit for collecting the federally-listed species. Thus, the initial survey did not satisfy the requirements for its intended purpose (i.e., an endangered species survey).		
An experienced, federally-permitted consulting group subsequently performed a follow-up survey in the same area and found a total of nine Carolina heelsplitters at eight separate locations on Six Mile Creek as well as a vast number of individuals from other species. It was concluded that this project had the potential to affect the Carolina heelsplitter, and appropriate measures were implemented.		

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EPA United States Environmental Protection Agency Washington, DC 20460 Work Assignment						Work Assignment Number 0-42				
						<input type="checkbox"/> Other <input type="checkbox"/> Amendment Number:				
Contract Number EP-C-12-021			Contract Period 09/26/2012 To 09/25/2013 Base <input checked="" type="checkbox"/> Option Period Number			Title of Work Assignment/SF Site Name Peer Review of Mussel Document				
Contractor EASTERN RESEARCH GROUP, INC.					Specify Section and paragraph of Contract SOW See PWS					
Purpose: <input checked="" type="checkbox"/> Work Assignment <input type="checkbox"/> Work Assignment Close-Out <input type="checkbox"/> Work Assignment Amendment <input type="checkbox"/> Incremental Funding <input checked="" type="checkbox"/> Work Plan Approval						Period of Performance From 01/15/2013 To 09/25/2013				
Comments:										
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Note: To report additional accounting and appropriations data use EPA Form 1900-69A.										
SFO <input type="checkbox"/> (Max 2)										
Line	DCN (Max 6)	Budget/FY (Max 4)	Appropriation Code (Max 6)	Budget Org/Code (Max 7)	Program Element (Max 9)	Object Class (Max 4)	Amount (Dollars)	(Cents)	Site/Project (Max 8)	Cost Org/Code (Max 7)
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Authorized Work Assignment Ceiling										
Contract Period:		Cost/Fee: \$0.00				LOE: 0				
09/26/2012 To 09/25/2013										
This Action:		\$14,819.00				186				
Total:		\$14,819.00				186				
Work Plan / Cost Estimate Approvals										
Contractor WP Dated: 02/13/2013		Cost/Fee: \$14,819.00				LOE: 186				
Cumulative Approved:		Cost/Fee: \$14,819.00				LOE: 186				
Work Assignment Manager Name Trish Rider <div style="display: flex; justify-content: space-between;"> <div>_____</div> <div>_____</div> </div> <div style="display: flex; justify-content: space-between;"> <div>(Signature)</div> <div>(Date)</div> </div>						Branch/Mail Code: Phone Number 202-564-0745 FAX Number:				
Project Officer Name Meghan Hessenauer <div style="display: flex; justify-content: space-between;"> <div>_____</div> <div>_____</div> </div> <div style="display: flex; justify-content: space-between;"> <div>(Signature)</div> <div>(Date)</div> </div>						Branch/Mail Code: Phone Number: 202-566-1040 FAX Number:				
Other Agency Official Name <div style="display: flex; justify-content: space-between;"> <div>_____</div> <div>_____</div> </div> <div style="display: flex; justify-content: space-between;"> <div>(Signature)</div> <div>(Date)</div> </div>						Branch/Mail Code: Phone Number: FAX Number:				
Contracting Official Name Brad Heath <div style="display: flex; justify-content: space-between;"> <div>_____</div> <div>_____</div> </div> <div style="display: flex; justify-content: space-between;"> <div>(Signature)</div> <div>(Date)</div> </div>						Branch/Mail Code: Phone Number: 513-487-2352 FAX Number:				

EPA United States Environmental Protection Agency Washington, DC 20460 Work Assignment						Work Assignment Number 0-43				
						<input type="checkbox"/> Other <input type="checkbox"/> Amendment Number:				
Contract Number EP-C-12-021			Contract Period 09/26/2012 To 09/25/2013 Base <input checked="" type="checkbox"/> Option Period Number			Title of Work Assignment/SF Site Name Peer Reviews of Aquatic Life				
Contractor EASTERN RESEARCH GROUP, INC.					Specify Section and paragraph of Contract SOW See PWS					
Purpose: <input checked="" type="checkbox"/> Work Assignment <input type="checkbox"/> Work Assignment Close-Out <input type="checkbox"/> Work Assignment Amendment <input type="checkbox"/> Incremental Funding <input type="checkbox"/> Work Plan Approval						Period of Performance From 12/12/2012 To 09/25/2013				
Comments:										
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SFO (Max 2) <input type="checkbox"/>										
Line	DCN (Max 6)	Budget/FY (Max 4)	Appropriation Code (Max 6)	Budget Org/Code (Max 7)	Program Element (Max 9)	Object Class (Max 4)	Amount (Dollars)	(Cents)	Site/Project (Max 8)	Cost Org/Code (Max 7)
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5										
Authorized Work Assignment Ceiling										
Contract Period:		Cost/Fee:			LOE:					
09/26/2012 To 09/25/2013										
This Action:										
Total:										
Work Plan / Cost Estimate Approvals										
Contractor WP Dated:				Cost/Fee:			LOE:			
Cumulative Approved:				Cost/Fee:			LOE:			
Work Assignment Manager Name Charles Delos <div style="display: flex; justify-content: space-between;"> <div>_____</div> <div>_____</div> </div> <div style="display: flex; justify-content: space-between;"> <div>(Signature)</div> <div>(Date)</div> </div>							Branch/Mail Code:			
							Phone Number 202-566-1097			
Project Officer Name Meghan Hessenauer <div style="display: flex; justify-content: space-between;"> <div>_____</div> <div>_____</div> </div> <div style="display: flex; justify-content: space-between;"> <div>(Signature)</div> <div>(Date)</div> </div>							FAX Number:			
							Branch/Mail Code:			
Other Agency Official Name <div style="display: flex; justify-content: space-between;"> <div>_____</div> <div>_____</div> </div> <div style="display: flex; justify-content: space-between;"> <div>(Signature)</div> <div>(Date)</div> </div>							Phone Number: 202-566-1040			
							FAX Number:			
Contracting Official Name Brad Heath <div style="display: flex; justify-content: space-between;"> <div>_____</div> <div>_____</div> </div> <div style="display: flex; justify-content: space-between;"> <div>(Signature)</div> <div>(Date)</div> </div>							Branch/Mail Code:			
							Phone Number: 513-487-2352			
							FAX Number:			

**PERFORMANCE WORK STATEMENT
CONTRACT EP-C-12-021
WORK ASSIGNMENT 0-43**

Title: Peer Reviews of Aquatic Life Criteria Materials

Work Assignment Manager:

Charles Delos
Phone 202-566-1097
Health and Ecological Criteria Division 4304T
Office of Science and Technology
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, NW
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Period of Performance: Work Assignment Issuance to September 25, 2013

Performance Work Statement: Section 3.6

Background

The U.S. Environmental Protection Agency (EPA) Office of Water is charged with protecting ecological integrity and human health from adverse anthropogenic, water-mediated effects, under the purview of the Clean Water Act. In support of this mission, EPA is working to develop and implement a water quality criterion to protect aquatic life from the toxic effects of selenium.

This Performance Work Statement (PWS) is intended to provide a focused, objective evaluation of the materials relevant to aquatic life criteria. EPA believes that the criticisms, suggestions, and new ideas provided by the peer reviewers will stimulate creative thought that helps improve the science that will underlie the final product.

This PWS involves separate peer reviews of two sets of materials related to aquatic life criteria: (a) modifications of the site-specific criteria modification approach known as the Recalculation Procedure, and (b) the aquatic life criterion document for selenium.

The contractor shall arrange for a peer review of the following document:

Revised Deletion Process for the Recalculation Procedure

The above document describes revisions of the procedure for adjusting criteria based on the taxonomic characteristics of the biota to be protected at a site. The document is approximately a dozen pages, plus an Excel spreadsheet.

The contractor shall also arrange for a (separate) peer review of the following document.

Draft Aquatic Life Water Quality Criteria for Selenium – 2012.

The above document presents a draft criterion expressed as the concentration of selenium in the eggs (or ovaries) of fish. It also presents a subordinate criterion expressed as the concentration of selenium in water. The complete document, with appendices and references, is in the neighborhood of 500 pages, but the key portions of the document, concise descriptions of the underlying data and the derivation of the tissue and water criteria, are roughly 70 pages.

Performance Work Statement

Task 1: Prepare a Work Plan

The contractor shall develop a work plan to address the requested work. The work plan must describe the steps that will be taken by the contractor to provide for the two peer reviews, including the selecting of peer reviewer candidates, determining absence of conflict of interest, distributing of documents and references, establishing schedules, and submitting the peer review reports.

The contractor shall provide the contractor's technical hours and costs arranged by task.

Task 2: Peer Review of the Site-Specific Recalculation Procedure

The object of this task is to arrange for the participation of three (3) peer reviewers to review the revised Recalculation Procedure. The relevant expertise should involve experience in deriving site-specific, statewide, or national aquatic life criteria and/or experience in applying the 1994/1997 Recalculation Procedure.

Task 3: Peer Review of the Draft Aquatic Life Criterion for Selenium

The object of this task is to arrange for the participation of seven (7) peer reviewers to review the draft criterion document. The document has two separable pieces, which involve two rather different areas of expertise:

- A. One deals with the derivation of the egg-ovary criterion based on studies of the reproductive toxicity of selenium to fish. Reviewers need expertise in aquatic toxicology, and some experience with evaluating selenium studies.

- B. The other deals with the translation of the egg-ovary criterion to a water criterion concentration based on bioaccumulation data and modeling. Reviewers need expertise in selenium partitioning and bioaccumulation in the environment.

Although the combined review panel must have expertise in both areas, no single peer reviewer is expected address both areas. Nevertheless, because some selenium experts have worked in both areas, reviewers have the freedom to address both areas. Consequently, the contractor should select each reviewer with the intent that they fulfill a role in one or the other area, while cognizant that a certain reviewers may choose to address both areas.

Stipulations Applicable to Conducting Both Task 2 and Task 3

The following stipulations apply to both tasks, although it is intended that Tasks 2 and 3 operate independently, on separate schedules.

The process for assembling peer reviewers is intended to allow the contractor to make use of the EPA WAM's knowledge of potentially useful peer reviewers while avoiding the possibility or even the appearance of the possibility that EPA could arrange the selection to generate a favorable review.

The EPA WAM may provide the contractor with a list of possible candidate peer reviewers. The contractor may combine EPA's list with the contractor's own compilation of possible peer reviewers, but is under no obligation to consider it. EPA's list represents persons that the EPA WAM believes may have suitable expertise in the area, and is provided only to assist the contractor compiling a list of potential candidates. It does not represent persons the EPA WAM wishes included or prefers over others that the contractor might consider. The contractor may consult with the WAM about the qualifications of potential reviewers, but the final selection is the responsibility of the contractor and is not controlled by the WAM.

From its list of candidates, the contractor is to select peer reviewers based on expertise, willingness, availability, freedom from financial conflicts of interest, and independence from primary advocacy of particular viewpoints upon which EPA is requesting review.

In making the final selection, the contractor is to consider the overall balance of the panel. In order to maximize the potential that all significant issues will be aired and addressed, the contractor should try to assure that the selected panel represents a broad range of backgrounds.

The contractor is to inform the EPA WAM of its final selection and its readiness to begin the review. When the contractor indicates readiness to begin peer review, the EPA WAM will provide the final version of the charge to the contractor, the document to be reviewed, and any supporting reference material. The contractor shall then provide each peer reviewer with copies of those materials, either in electronic or paper form.

The contractor is to inform the EPA WAM of any requests from peer reviewers for additional supporting reference material, and is to transmit back to the peer reviewers any such material as

the EPA WAM is able to provide. The contractor shall monitor the peer reviewers' progress, to assure timely completion.

Upon obtaining the comments from each peer reviewer, the contractor shall transmit them to the WAM. The EPA WAM will review the individual reviewer comments to determine whether there are any ambiguities that need clarification, and comment by written technical direction.

When the EPA WAM indicates that there are no issues requiring clarification (peer reviewers' potential misunderstandings of EPA intentions on critical issues under review, or EPA's uncertainties about the meaning of particular comments), the contractor shall submit the peer review final report in electronic form. The final report is to consist of the individual reviewer comments and responses to the charge questions, arranged sequentially by reviewer.

Special Reporting Requirements

There are no special reporting requirements associated with this work assignment other than those specified by the Contract and in the above Task statements.

Deliverables and Schedule

Work Plan:

Task 1 Prepare work plan: In accordance with contract requirements.

Recalculation Procedure Review:

Task 2 Identify potential Recalculation Procedure peer reviewer candidates: 20 days after receipt of PWS.

Task 2 Complete the final selection of Recalculation Procedure peer reviewers, ready to begin review: 25 days after receipt of PWS.

Task 2 Send peer reviewer comments on Recalculation Procedure to WAM: 21 days after completion of previous step or after the WAM provides final materials for review (whichever is later).

Task 2 Final peer review report on Recalculation Procedure review: 5 days after WAM indicates that there are no (further) questions about the peer review comments.

Selenium Criterion Review

Task 3 Identify potential selenium peer reviewer candidates: 30 days after receipt of PWS.

- Task 3 Complete the final selection of selenium peer reviewers, ready to begin review: 40 days after receipt of PWS.
- Task 3 Send peer reviewer comments on selenium criterion to WAM: 28 days after completion of previous step or after the WAM provides final materials for review (whichever is later).
- Task 3 Final peer review report on selenium criterion: 5 days after WAM indicates that there are no (further) questions about the peer review comments.

Travel

No travel is anticipated under this work assignment.

Work Assignment Form, (WebForms v1.0)

EPA United States Environmental Protection Agency Washington, DC 20460 Work Assignment						Work Assignment Number 0-44				
						<input type="checkbox"/> Other <input type="checkbox"/> Amendment Number:				
Contract Number EP-C-12-021			Contract Period 09/26/2012 To 09/25/2013 Base <input checked="" type="checkbox"/> Option Period Number			Title of Work Assignment/SF Site Name Hyd Fracturing Meeting Support				
Contractor EASTERN RESEARCH GROUP, INC.					Specify Section and paragraph of Contract SOW See PWS					
Purpose: <input checked="" type="checkbox"/> Work Assignment <input type="checkbox"/> Work Assignment Close-Out <input type="checkbox"/> Work Assignment Amendment <input type="checkbox"/> Incremental Funding <input type="checkbox"/> Work Plan Approval						Period of Performance From 01/15/2013 To 09/25/2013				
Comments:										
<div style="display: flex; justify-content: space-between;"> <input type="checkbox"/> Superfund Accounting and Appropriations Data <input checked="" type="checkbox"/> Non-Superfund </div>										
Note: To report additional accounting and appropriations data use EPA Form 1900-69A.										
SFO (Max 2) <input type="checkbox"/>										
Line	DCN (Max 6)	Budget/FY (Max 4)	Appropriation Code (Max 6)	Budget Org/Code (Max 7)	Program Element (Max 9)	Object Class (Max 4)	Amount (Dollars)	(Cents)	Site/Project (Max 8)	Cost Org/Code (Max 7)
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2										
3										
4										
5										
Authorized Work Assignment Ceiling										
Contract Period:		Cost/Fee:			LOE:					
09/26/2012 To 09/25/2013										
This Action:										
Total:										
Work Plan / Cost Estimate Approvals										
Contractor WP Dated:				Cost/Fee:			LOE:			
Cumulative Approved:				Cost/Fee:			LOE:			
Work Assignment Manager Name Lisa Matthews <div style="display: flex; justify-content: space-between;"> <div>_____ (Signature)</div> <div>_____ (Date)</div> </div>							Branch/Mail Code: Phone Number 202-564-6669 FAX Number:			
Project Officer Name Meghan Hessenauer <div style="display: flex; justify-content: space-between;"> <div>_____ (Signature)</div> <div>_____ (Date)</div> </div>							Branch/Mail Code: Phone Number: 202-566-1040 FAX Number:			
Other Agency Official Name <div style="display: flex; justify-content: space-between;"> <div>_____ (Signature)</div> <div>_____ (Date)</div> </div>							Branch/Mail Code: Phone Number: FAX Number:			
Contracting Official Name Brad Heath <div style="display: flex; justify-content: space-between;"> <div>_____ (Signature)</div> <div>_____ (Date)</div> </div>							Branch/Mail Code: Phone Number: 513-487-2352 FAX Number:			

**Performance Work Statement
Contract EP-C-12-021
Work Assignment 0-44**

Title: Meeting Support for Hydraulic Fracturing Technical Workshops and Roundtables

Period of Performance: January 15, 2013 through September 25, 2013

Work Assignment Manager: Lisa Matthews
U.S. EPA Office of Research and Development
1200 Pennsylvania Ave., NW (8101R)
Washington, DC 20460
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202-577-4035 (cell)
matthews.lisa@epa.gov

BACKGROUND

At the request of Congress, EPA is conducting a study of the potential impacts of hydraulic fracturing on drinking water resources. The scope of the research includes the full lifespan of water in hydraulic fracturing. EPA believes a transparent, research-driven approach with significant stakeholder involvement can address questions about hydraulic fracturing and strengthen our clean energy future.

EPA is enhancing the stakeholder outreach efforts related to its *Study of the Potential Impacts of Hydraulic Fracturing on Drinking Water Resources* (Hydraulic Fracturing Study). As part of this effort, EPA will regularly engage technical experts from key stakeholder groups, including industry, non-governmental organizations, other federal agencies, state and local governments, tribes and the academic community, in an effort to assure that we have ongoing access to a broad range of expertise and data outside the Agency, improve public understanding of the goals and design of the study, obtain timely and constructive feedback on data and analysis developed in the study, and assure that EPA is current on changes in industry practices and technologies so the report of results reflects an up-to-date picture of hydraulic fracturing operations.

Information sharing among technical experts from diverse backgrounds and interests is important to ensure that EPA has all the information it needs to provide the best available science. EPA will hold a webinar in early January 2013 to report out on the November 2012 technical roundtable meetings and the release of the study progress report. EPA will select workshop topics from among those identified in the five roundtable discussions for a series of technical workshops beginning in February 2013. Workshops discussions will inform EPA on focused subjects integral to hydraulic fracturing to enhance the overall study, increase collaborative opportunities and inform additional possible future research. EPA will seek subject-matter experts to contribute to the workshops as invited presenters and participants who will provide technical knowledge during the workshop discussions. Upon completion of the last technical

workshop, EPA will reconvene the original roundtables to review the work addressed in the technical workshop series.

The contractor shall support the technical workshops and roundtable meetings by providing meeting support and logistics and preparing meeting summary reports.

Throughout this work assignment, the contractor shall provide draft and final reports to EPA in electronic and hard copy formats. The contractor shall discuss the computer file formats to be used for word processing, spreadsheet, database and graphics with the EPA WAM prior to file preparation.

TASK

EPA plans to hold five technical workshops in follow-up to the November 2012 technical roundtable meetings. The first in this series of technical workshops will be held to discuss Analytical Chemical Methods related to EPA's research study on February 25, 2013 in RTP, NC. Nominations of experts wishing to participate in this technical workshop will close on January 8, 2013.

The topics of the remaining technical workshops include the following (dates and locations are expected to be finalized in January 2013):

- Water Acquisition: Assessing impacts through modeling and other means (target date April 17, 2013)
- Wastewater Treatment and Modeling (target date April 18, 2013)
- Well Construction/Operation and Subsurface Modeling (target date June 4, 2013)
- Case Studies (target date June 5, 2013)

Workshops discussions will inform EPA on focused subjects integral to hydraulic fracturing to enhance the overall study, increase collaborative opportunities and inform additional possible future research. EPA will seek subject-matter experts to contribute to the workshops as invited presenters and participants who will provide technical knowledge during the workshop discussions. Upon completion of the last technical workshop, EPA will reconvene the original roundtable participants (target July 2013 for a 1-1.5 day meeting) to review the work addressed in the technical workshop series.

All technical workshop and roundtable meetings would be held in EPA meeting space. Each technical workshop would be a 1-day meeting. A different set of experts will need to be identified to be invited to each technical workshop. Technical information that is discussed at the roundtable meetings and workshops will be further discussed in follow-up webinars to engage the broader stakeholder community.

The Contractor would support the technical workshops and roundtable meeting by providing meeting support and logistics and development of meeting summary reports. This work will include developing and managing a meeting registration web site, collecting, compiling and analyzing biographies, CVs/resumes and abstracts from persons who wish to present research technical information at the workshops, preparing meeting materials (nametags, placards,

logistics sheet, list of attendees and contact information for EPA), note taking and preparing a concise meeting summary report that summarizes the presentations and discussion highlights for each meeting.

The meeting summary reports must be accurate, complete, understandable and carefully composed so that they are understandable for people who were not at the meeting. Drafts of summary reports will be due approximately 5 business days following each meeting. EPA plans to post the final meeting summary reports on the web for the public in a timely manner.

The contractor shall assist with the preparation of meeting materials, including development of graphics, PowerPoint presentations and other materials as needed.

ERG staff (note taker/writer) will be required to travel to the technical workshops and roundtable meetings. For budgeting purposes, plan on two trips to RTP, NC (1 day and 2 days, respectively) and two trips to Washington, DC (1.5 days and 2 days, respectively) through July 2013. All meetings will be held in EPA space. Each technical workshop will have approximately 40-50 experts. The technical roundtables have approximately 70 participants and observers.

<i>Deliverables</i>	<i>Due Date</i>
<i>Compilation of Nominations for Analytical Chemical Methods Workshop (email and hard copy)</i>	Via Technical Direction of WAM
<i>Send invitations for Analytical Chemical Methods Workshop</i>	By January 24, 2013
<i>Technical Expert Registration for remaining technical workshops</i>	By January 31, 2013
<i>Finalize meeting logistics</i>	1 week prior to meeting
<i>Draft Meeting Summary Report</i>	5 business days following workshop/roundtable meeting
<i>Final Meeting Summary Report</i>	5 business days following receipt of EPA comments

Travel

ERG staff (note taker/writer) will be required to travel to approximately four meetings. The first technical workshop will be held on February 25, 2013 in RTP, NC. For budgeting purposes, it is expected that there will be a total of two trips to RTP, NC (1 day and 2 days, respectively) and two trips to DC (1.5 days and 2 days, respectively) through July 2013. The dates and locations of the remaining workshops have not yet been determined. All Contractor travel must be approved by the Project Officer in advance.

Meetings

To avoid the perception that contractor personnel are EPA employees, contractor personnel shall be clearly identified as independent contractors of EPA when participating in events with outside parties.

Limitation of Contractor Activities

The contractor will submit drafts of all deliverables to the EPA WAM for review prior to

submission of the final product. The contractor will incorporate all EPA WAM comments into all final deliverables, unless otherwise agreed upon by the EPA WAM. The contractor will adhere to all applicable EPA management control procedures as implemented by the EPA Contracting Officer (CO), PO and WAM.

Confidential Business Information

During the course of the work assignment, the contractor may be required to access and evaluate CBI. As such, the contractor shall adhere to EPA's CBI policy and procedures as described in the contract performance work statement. The contractor must obtain CBI security clearance to use CBI information. The contractor shall utilize CBI information in accordance with contract requirements and limitations, including the TSCA CBI security plan.

Quality Assurance and Quality Control

All meeting summaries produced by the Contractor under this work assignment shall include a discussion of the QA/QC activities that were or shall be performed to support the deliverable. For example, the meeting summary shall include a clear discussion of the quality management strategies that were employed to control and document the quality of data generated and used.

The contractor also shall provide EPA with monthly reports of QA activities performed during implementation of this work assignment. These monthly QA reports shall identify QA activities performed to support implementation of this work assignment, problems encountered, and corrective actions taken. If desired, the contractor may include this as a part of the contract-required monthly financial/technical progress report.

EPA United States Environmental Protection Agency Washington, DC 20460 Work Assignment						Work Assignment Number 0-44				
						<input type="checkbox"/> Other <input type="checkbox"/> Amendment Number:				
Contract Number EP-C-12-021			Contract Period 09/26/2012 To 09/25/2013 Base <input checked="" type="checkbox"/> Option Period Number			Title of Work Assignment/SF Site Name Hyd Fracturing Meeting Support				
Contractor EASTERN RESEARCH GROUP, INC.					Specify Section and paragraph of Contract SOW See PWS					
Purpose: <input checked="" type="checkbox"/> Work Assignment <input type="checkbox"/> Work Assignment Close-Out <input type="checkbox"/> Work Assignment Amendment <input type="checkbox"/> Incremental Funding <input checked="" type="checkbox"/> Work Plan Approval						Period of Performance From 01/15/2013 To 09/25/2013				
Comments:										
<div style="display: flex; justify-content: space-between;"> <input type="checkbox"/> Superfund Accounting and Appropriations Data <input checked="" type="checkbox"/> Non-Superfund </div>										
Note: To report additional accounting and appropriations data use EPA Form 1900-69A.										
SFO <input type="checkbox"/> (Max 2)										
Line	DCN (Max 6)	Budget/FY (Max 4)	Appropriation Code (Max 6)	Budget Org/Code (Max 7)	Program Element (Max 9)	Object Class (Max 4)	Amount (Dollars)	(Cents)	Site/Project (Max 8)	Cost Org/Code (Max 7)
1										
2										
3										
4										
5										
Authorized Work Assignment Ceiling										
Contract Period:		Cost/Fee:		\$0.00		LOE:		0		
09/26/2012 To 09/25/2013										
This Action:				\$104,821.00		939				
Total:				\$104,821.00		939				
Work Plan / Cost Estimate Approvals										
Contractor WP Dated:		02/22/2013		Cost/Fee:		\$104,821.00		LOE:		939
Cumulative Approved:				Cost/Fee:		\$104,821.00		LOE:		939
Work Assignment Manager Name Lisa Matthews <div style="display: flex; justify-content: space-between;"> <div>_____ (Signature)</div> <div>_____ (Date)</div> </div>						Branch/Mail Code: Phone Number 202-564-6669 FAX Number:				
Project Officer Name Meghan Hessenauer <div style="display: flex; justify-content: space-between;"> <div>_____ (Signature)</div> <div>_____ (Date)</div> </div>						Branch/Mail Code: Phone Number: 202-566-1040 FAX Number:				
Other Agency Official Name <div style="display: flex; justify-content: space-between;"> <div>_____ (Signature)</div> <div>_____ (Date)</div> </div>						Branch/Mail Code: Phone Number: FAX Number:				
Contracting Official Name Brad Heath <div style="display: flex; justify-content: space-between;"> <div>_____ (Signature)</div> <div>_____ (Date)</div> </div>						Branch/Mail Code: Phone Number: 513-487-2352 FAX Number:				

Work Assignment Form, (WebForms v1.0)

**Performance Work Statement
Contract EP-C-12-021
Work Assignment WA 0-44
Amendment 1**

Title: Meeting Support for Hydraulic Fracturing Technical Workshops and Roundtables

Period of Performance: February 8, 2013 through September 25, 2013

Work Assignment Manager: Lisa Matthews
U.S. EPA Office of Research and Development
1200 Pennsylvania Ave., NW (8101R)
Washington, DC 20460
202-564-6669 (ph)
202-577-4035 (BBerry)
matthews.lisa@epa.gov

BACKGROUND

At the request of Congress, EPA is conducting a study of the potential impacts of hydraulic fracturing on drinking water resources. The scope of the research includes the full lifespan of water in hydraulic fracturing. EPA believes a transparent, research-driven approach with significant stakeholder involvement can address questions about hydraulic fracturing and strengthen our clean energy future.

EPA is enhancing the stakeholder outreach efforts related to its *Study of the Potential Impacts of Hydraulic Fracturing on Drinking Water Resources* (Hydraulic Fracturing Study). As part of this effort, EPA will regularly engage technical experts from key stakeholder groups, including industry, non-governmental organizations, other federal agencies, state and local governments, tribes and the academic community, in an effort to assure that we have ongoing access to a broad range of expertise and data outside the Agency, improve public understanding of the goals and design of the study, obtain timely and constructive feedback on data and analysis developed in the study, and assure that EPA is current on changes in industry practices and technologies so the report of results reflects an up-to-date picture of hydraulic fracturing operations.

Information sharing among technical experts from diverse backgrounds and interests is important to ensure that EPA has all the information it needs to provide the best available science. EPA will hold a webinar in early January 2013 to report out on the November 2012 technical roundtable meetings and the release of the study progress report. EPA will select workshop topics from among those identified in the five roundtable discussions for a series of technical workshops beginning in February 2013. Workshops discussions will inform EPA on focused subjects integral to hydraulic fracturing to enhance the overall study, increase collaborative opportunities and inform additional possible future research. EPA will seek subject-matter experts to contribute to the workshops as invited presenters and participants who will provide

technical knowledge during the workshop discussions. Upon completion of the last technical workshop, EPA will reconvene the original roundtables to review the work addressed in the technical workshop series.

The contractor shall support the technical workshops and roundtable meetings by providing meeting support and logistics and preparing meeting summary reports.

Throughout this work assignment, the contractor shall provide draft and final reports to EPA in electronic and hard copy formats. The contractor shall discuss the computer file formats to be used for word processing, spreadsheet, database and graphics with the EPA WAM prior to file preparation.

TASK

EPA plans to hold five technical workshops in follow-up to the November 2012 technical roundtable meetings. The first in this series of technical workshops will be held to discuss Analytical Chemical Methods related to EPA's research study on February 25, 2013 in RTP, NC. Nominations of experts wishing to participate in this technical workshop will close on January 8, 2013.

The topics of the remaining technical workshops include the:

- Well Construction/Operation and Subsurface Modeling (April 16-17 in RTP, NC)
- Wastewater Treatment and Related Modeling (April 18 in RTP, NC)
- Water Acquisition: Assessing Impacts Through Modeling and Other Means (June 4 in Arlington, VA)
- Hydraulic Fracturing Case Studies (June 5 in Arlington, VA)

Workshops discussions will inform EPA on focused subjects integral to hydraulic fracturing to enhance the overall study, increase collaborative opportunities and inform additional possible future research. EPA will seek subject-matter experts to contribute to the workshops by providing technical knowledge during workshop discussions and through selected invited presentations. Upon completion of the last technical workshop, EPA will reconvene the original roundtable participants (tentatively planned for July 23-24, 2013 for a 1.5 day meeting in Arlington, VA) to review the work addressed in the technical workshop series.

All technical workshop and roundtable meetings would be held in EPA meeting space. Technical workshops will be a one day meeting each, with the exception of Well Construction which is expected to run 1.5 days. A different set of experts will need to be identified to be invited to each technical workshop. Technical information that is discussed at the roundtable meetings and workshops will be further discussed in follow-up webinars to engage the broader stakeholder community.

The contractor would support the technical workshops and roundtable meeting by providing meeting support and logistics and development of meeting summary reports. This work will include developing and managing a meeting registration web site, posting biographies,

CVs/resumes and abstracts from persons who wish to participate research technical information on an FTP site for EPA to download and review, preparing meeting materials (nametags, placards, logistics sheet, a formatted final agenda, original list of participants in electronic format and attendees' contact information for EPA), note taking and preparing a concise meeting summary report that summarizes the presentations and discussion highlights for each meeting (see attached technical workshops report outline).

The meeting summary reports must be accurate, complete, understandable and carefully composed so that they are understandable for people who were not at the meeting. Draft reports will be due within 7 business days following each workshop. Draft report will be due in 2 weeks following the July roundtable meeting. For both the technical workshops and roundtable, final reports will be due within 5 business days of receipt of all comments. The Contractor will prepare a 508-compliant pdf of each meeting summary report. EPA plans to post the final meeting summary reports on the web for the public in a timely manner.

EPA will conduct the following activities:

- Format, copyedit, and proof presenter bios for the workshops. This assumes that ERG posts the bios on an FTP site for her to download and complete. EPA would copy and/or post these, as appropriate.
- Download and copy the compiled bio/resume/abstract report ERG will prepare for each presenter candidate submission for the remaining technical workshops.
- Receive, track, and download presenters' slides for all workshops. Compile and make copies of the presenters' slides for each of 5 workshops.
- Contact workshop presenters to obtain availability and set up and coordinate the briefing calls with presenters; send out e-mails to confirm call in information, etc. Liaison with the speakers re: deadlines, format for presentations, etc.
- Copy and compile handout materials for workshops and roundtables, to include the final agenda, list of participants, and slide hard copy of presentations. ERG would prepare the original list of participants in electronic format and a formatted final agenda and send to EPA for copying. EPA will prepare the final handout folders for all workshops and roundtables.

ERG staff (senior level note taker/writer) will be required to travel to the technical workshops and roundtable meetings. This includes two trips to RTP, NC (1 day and 3 days, respectively) and two trips to Washington, DC (1.5 days and 2 days, respectively) through July 2013. All meetings will be held in EPA space. Each technical workshop will have approximately 40-50 external experts plus EPA staff.

<i>Deliverables</i>	<i>Due Date</i>
<i>Compilation of Nominations for workshop</i>	Next business day after nominations close
<i>Send invitations for Analytical Chemical Methods Workshop</i>	By January 22, 2013
<i>Launch Technical Expert Registration page for remaining technical workshops</i>	By January 28, 2013
<i>Send invitations for workshops/roundtables</i>	1 month prior to meeting
<i>Finalize meeting logistics</i>	1 week prior to meeting
<i>Draft Workshop Summary Report</i>	7 business days following workshop meeting
<i>Draft Roundtables Summary Report</i>	2 weeks following roundtables meeting
<i>Final Meeting Summary Report</i>	5 business days following receipt of EPA comments

Travel

ERG staff (senior level note taker/writer) will be required to travel to workshop and roundtable meetings as noted above. This includes two trips to RTP, NC (1 day and 3 days, respectively) and two trips to Washington, DC (1.5 days and 2 days, respectively) through July 2013. All meetings will be held in EPA space. Each technical workshop will have approximately 40-50 external experts plus EPA staff.

All Contractor travel must be approved by the Project Officer in advance.

Meetings

To avoid the perception that contractor personnel are EPA employees, contractor personnel shall be clearly identified as independent contractors of EPA when participating in events with outside parties.

Limitation of Contractor Activities

The contractor will submit drafts of all deliverables to the EPA WAM for review prior to submission of the final product. The contractor will incorporate all EPA WAM comments into all final deliverables, unless otherwise agreed upon by the EPA WAM. The contractor will adhere to all applicable EPA management control procedures as implemented by the EPA Contracting Officer (CO), PO and WAM.

Confidential Business Information

During the course of the work assignment, the contractor may be required to access and evaluate CBI. As such, the contractor shall adhere to EPA's CBI policy and procedures as described in the contract performance work statement. The contractor must obtain CBI security clearance to use CBI information. The contractor shall utilize CBI information in accordance with contract requirements and limitations, including the TSCA CBI security plan.

Quality Assurance and Quality Control

All meeting summaries produced by the Contractor under this work assignment shall include a

discussion of the QA/QC activities that were or shall be performed to support the deliverable. For example, the meeting summary shall include a clear discussion of the quality management strategies that were employed to control and document the quality of data generated and used.

The contractor also shall provide EPA with monthly reports of QA activities performed during implementation of this work assignment. These monthly QA reports shall identify QA activities performed to support implementation of this work assignment, problems encountered, and corrective actions taken. If desired, the contractor may include this as a part of the contract-required monthly financial/technical progress report.

EPA United States Environmental Protection Agency Washington, DC 20460 Work Assignment						Work Assignment Number 0-44				
						<input type="checkbox"/> Other <input type="checkbox"/> Amendment Number:				
Contract Number EP-C-12-021			Contract Period 09/26/2012 To 09/25/2013 Base <input checked="" type="checkbox"/> Option Period Number			Title of Work Assignment/SF Site Name Hyd Fracturing Meeting Support				
Contractor EASTERN RESEARCH GROUP, INC.					Specify Section and paragraph of Contract SOW See PWS					
Purpose: <input checked="" type="checkbox"/> Work Assignment <input type="checkbox"/> Work Assignment Close-Out <input type="checkbox"/> Work Assignment Amendment <input type="checkbox"/> Incremental Funding <input checked="" type="checkbox"/> Work Plan Approval						Period of Performance From 01/15/2013 To 09/25/2013				
Comments:										
<div style="display: flex; justify-content: space-between;"> <input type="checkbox"/> Superfund Accounting and Appropriations Data <input checked="" type="checkbox"/> Non-Superfund </div>										
Note: To report additional accounting and appropriations data use EPA Form 1900-69A.										
SFO <input type="checkbox"/> (Max 2)										
Line	DCN (Max 6)	Budget/FY (Max 4)	Appropriation Code (Max 6)	Budget Org/Code (Max 7)	Program Element (Max 9)	Object Class (Max 4)	Amount (Dollars)	(Cents)	Site/Project (Max 8)	Cost Org/Code (Max 7)
1										
2										
3										
4										
5										
Authorized Work Assignment Ceiling										
Contract Period:		Cost/Fee: \$0.00				LOE: 0				
09/26/2012 To 09/25/2013										
This Action:		\$104,821.00				939				
Total:		\$104,821.00				939				
Work Plan / Cost Estimate Approvals										
Contractor WP Dated: 02/22/2013		Cost/Fee: \$104,821.00				LOE: 939				
Cumulative Approved:		Cost/Fee: \$104,821.00				LOE: 939				
Work Assignment Manager Name Lisa Matthews <div style="display: flex; justify-content: space-between;"> <div>_____ (Signature)</div> <div>_____ (Date)</div> </div>						Branch/Mail Code: Phone Number 202-564-6669 FAX Number:				
Project Officer Name Meghan Hessenauer <div style="display: flex; justify-content: space-between;"> <div>_____ (Signature)</div> <div>_____ (Date)</div> </div>						Branch/Mail Code: Phone Number: 202-566-1040 FAX Number:				
Other Agency Official Name <div style="display: flex; justify-content: space-between;"> <div>_____ (Signature)</div> <div>_____ (Date)</div> </div>						Branch/Mail Code: Phone Number: FAX Number:				
Contracting Official Name Brad Heath <div style="display: flex; justify-content: space-between;"> <div>_____ (Signature)</div> <div>_____ (Date)</div> </div>						Branch/Mail Code: Phone Number: 513-487-2352 FAX Number:				

Work Assignment Form, (WebForms v1.0)

**Performance Work Statement
Contract EP-C-12-021
Work Assignment 0-45**

Title:

Peer Review of Systematic Review Protocol for Secondary Contact Water Quality Standards for Pathogens

Work Assignment Manager:

Gary Russo (Mail Code 4305T)
Standards and Health Protection Division
Office of Water, Office of Science and Technology
1200 Pennsylvania Avenue, N.W.
Washington, DC 20460
Phone (202) 566-1335
E-mail: russo.gary@epa.gov

Alternate WAM:

Sharon Nappier (Mail Code 4304T)
Health and Ecological Criteria Division
Office of Water, Office of Science and Technology
1200 Pennsylvania Avenue, N.W.
Washington, DC 20460
Phone (202) 566-0740
E-mail: nappier.sharon@epa.gov

Period of Performance: February 28, 2013 through September 25, 2013

Contractor SOW: Section 3.6

CBI: No confidential business information will be needed for this work assignment.

Purpose:

The purpose of this work assignment is to conduct an external peer review of the protocol for a systematic review that will evaluate the risk of illness associated with different recreational activities in water contaminated with fecal material. The peer review shall obtain views and comments from independent experts outside the EPA in the form of individual letter reviews consistent with the EPA's *Peer Review Handbook: 3rd Edition* (<http://www.epa.gov/oamcinc1/1200015/handbook.pdf>).

Background:

The EPA has recently revised its bacteriological water quality criteria under section 304(a) of the Clean Water Act (CWA). The revised criteria address water quality standards for “primary contact” recreational uses but do not address “secondary contact” recreational uses. Primary contact recreation is typically defined as water-based recreational activities that could be expected to result in the ingestion of or immersion in water such as swimming, water skiing, or surfing. Secondary contact recreation is typically defined as water-based recreational activities where contact with the water is either incidental or accidental, and the probability of ingesting appreciable quantities of water is minimal.

Current EPA policy allows States, tribes and territories to adopt bacteriological criteria for secondary contact uses that are less stringent than criteria for primary contact uses. The justification for less stringent secondary contact criteria is based on the assumption that secondary contact activities are associated with exposure to fewer pathogenic organisms. It is believed that a higher concentration of pathogens in water is counterbalanced by a lower potential exposure to those pathogens, resulting in the same risk of illness associated with primary recreational activities. However, the potential for pathogen exposure and infection during different recreational activities is not well characterized, and there is currently no scientific consensus on whether or not, for a given water quality, primary and secondary contact activities are in fact associated with a different risk of illness.

Although there is a body of scientific literature addressing the risk of illness associated with various water-based recreational activities, the relationships between different activities, water quality, and health risks are not well understood. The wide ranges of existing studies often provide ambiguous results or support conflicting conclusions. Such ambiguities and/or disagreements may be due to a variety of reasons, including differences in the questions being addressed, differences, biases and/or flaws in the way the studies were design or conducted, differences in interpretation of the study results, or simply due to chance.

To better understand the risk of illness associated with different recreational activities in water contaminated with fecal material, the EPA is conducting a systematic review. A systematic review is a specific type of literature review that focuses on a specific research question and tries to identify, appraise, select and synthesize all high quality research evidence relevant to that question. The EPA intends to utilize the outcome of the systematic review to inform EPA policies and decisions associated with recreational water quality standards for the protection of public health.

A critical part of the systematic review is the development of a systematic review protocol. The review protocol describes all the methods and procedures that will be followed during the review process. The review protocol is developed before the review is conducted to minimize bias and to promote transparency and reproducibility. The review protocol describes the scientific question(s) that will be addressed, the key contextual factors and conceptual issues relevant to the review questions, the search strategy that will identify relevant studies, the criteria and process by which decisions on the selection of studies will be made, the procedures expected to

be used for data extraction, the process for appraising study quality and weighting studies on the basis of their appraised quality, and the strategy that will be used for data synthesis. Once the review process has begun, it should not deviate from the review protocol except under very limited circumstances for certain acceptable purposes.

Performance Work Statement (PWS):

Development of the review protocol is a critical step in the systematic review because it dictates in advance how the review will be conducted. Because of this central role in the systematic review, the EPA is seeking an external peer review of the systematic review protocol to ensure that the systematic review is scientifically defensible, accomplishes its purpose, and is conducted in a manner that minimizes bias.

Task 1: Prepare a work plan and cost estimate

The contractor shall develop a work plan and cost estimate for the tasks in this work assignment. The work plan shall describe the steps that will be taken by the contractor to conduct the peer review, including selection of peer reviewer candidates, determination of conflicts of interest, distribution of documents and references, establishment of schedules, and submission of the peer review report. The cost estimate shall include the proposed level of effort, budget, schedule of tasks, and a timeline (with projected dates) for completion of the tasks. The contractor shall submit the work plan and cost estimate to the EPA Contracting Officer (CO), Project Officer (PO), and Work Assignment Manager (WAM) for approval.

Deliverables: Work plan and cost estimate.

Due Date: In accordance with contract requirements.

Task 2: Select potential reviewers

The contractor shall conduct the peer review using no fewer than three (3) and no more than five (5) reviewers. To choose reviewers, the contractor shall first develop a list of potential reviewers. Potential reviewers shall have a doctoral degree and have expertise in epidemiological research and evaluation of the health effects of microbiological water pollution, and have either performed systematic reviews themselves or have expertise in systematic review methodology. Potential reviewers shall also be proficient in advanced statistical methods that are typically used to analyze epidemiological data and perform meta-analyses.

To assist the contractor in compiling the list of potential reviewers, the EPA WAM may provide the contractor with a list of possible candidate reviewers for consideration. At the contractor's discretion, the contractor may add one or more of the EPA's suggested reviewers to the contractor's own list of potential reviewers, but is under no obligation to consider any of them. The purpose of EPA's list of potential reviewers is to allow the contractor to utilize the EPA WAM's knowledge of potential reviewers with suitable expertise, but does not in any way represent a preference for any particular reviewers. The contractor shall ensure the selection of potential reviewers is performed in a manner that is consistent with an impartial scientific peer review without conflict of interest or the appearance of conflict of interest.

After the contractor has compile a list of potential reviewers, the contractor shall select five (5) reviewers from the list on the basis of expertise, expectation of review quality, expected compliance with due date, and absence of conflicts of interest. The contractor shall make the final selection of reviewers within ten (10) business days of approval of the work plan and shall inform the EPA WAM of readiness to begin the review. The contractor shall not disclose the identity of any of the reviewers until after the peer review is complete.

Deliverable: Notification of readiness to begin review.

Due Date: Ten (10) business days after approval of the work plan.

Task 3: Obtain the Peer Review

After the contractor indicates readiness to begin review, the EPA WAM will provide the contractor the Charge to Reviewers, the documents to be reviewed, and any supporting material. Upon receiving these materials, the contractor shall provide them to each peer reviewer and instruct them to begin their review. The contractor shall inform each reviewers they have 20 (twenty) business days to complete their review and submit their comments. The contractor shall inform the EPA WAM of any requests from reviewers for additional information or material within two (2) business days of receiving such requests, and shall transmit back to the reviewers the material provided by the EPA WAM within two (2) business days.

The contractor shall monitor the peer reviewers' progress to assure timely completion of the review. Upon obtaining the comments from the reviewers, the contractor shall collate them into a peer draft review report and submit it to the EPA WAM. If requested by the EPA WAM, the contractor shall electronically transmit copies of each peer reviewer's comments separately within two (2) business days of receiving them as both PDF and Microsoft Word documents.

The EPA WAM will review the draft peer review report to determine if additional clarifications are required. If the EPA WAM requests clarifications from any of the reviewers, the contractor shall transmit those requests to the appropriate reviewer within two (2) business days of receiving the request from the EPA WAM. The contractor shall request a written response from the reviewer within five (5) business days of the reviewer receiving the request. The contractor shall transmit the reviewer response back to the EPA WAM within two (2) business days of receiving a response from the reviewer. After the EPA WAM informs the contractor that no additional clarifications are needed from any of the reviewers, the contractor shall generate a final report and submit the report to the EPA WAM as both PDF and Microsoft Word documents.

Deliverable: Individual reviewer comments (if requested).

Due Date: Two (2) business days after receipt from reviewers

Deliverable: Response to request for clarifications (if requested).

Due Date: Two (2) business days after receipt from reviewers

Deliverable: Final peer review report.

Due Date: Five (5) business days after notification from EPA WAM that no further clarifications are required.

Special Reporting Requirements

There are no special reporting requirements associated with this work assignment other than those specified by the Contract and in the above task statements.

Travel

No travel is required under this work assignment.

General Requirements of the Work Assignment and Schedule:

Due Dates

The contractor shall notify the EPA WAM in advance, if a due date will not be met and negotiate a mutually acceptable revised due date.

Delays

The contractor shall provide sufficient qualified man-power to ensure there are no avoidable delays. If a delay outside the control of the contractor is unavoidable, the contractor shall immediately notify the EPA WAM and negotiate a mutually acceptable revised schedule.

Draft Documents

The contractor shall submit draft or interim work products requested by the EPA WAM. Draft or interim work products shall be prepared in an electronic format compatible with Microsoft Office 2007. The EPA WAM will provide the contractor with comments on draft work products in electronic format. Work products shall be deemed draft until designated as final by the EPA WAM.

Final Documents

The contractor shall submit final documents electronically to the EPA WAM as both PDF and Microsoft Word documents.

EPA United States Environmental Protection Agency Washington, DC 20460 Work Assignment						Work Assignment Number 0-45				
						<input type="checkbox"/> Other <input type="checkbox"/> Amendment Number:				
Contract Number EP-C-12-021			Contract Period 09/26/2012 To 09/25/2013 Base <input checked="" type="checkbox"/> Option Period Number			Title of Work Assignment/SF Site Name Review of Secondary Contact				
Contractor EASTERN RESEARCH GROUP, INC.					Specify Section and paragraph of Contract SOW See PWS					
Purpose: <input checked="" type="checkbox"/> Work Assignment <input type="checkbox"/> Work Assignment Close-Out <input type="checkbox"/> Work Assignment Amendment <input type="checkbox"/> Incremental Funding <input checked="" type="checkbox"/> Work Plan Approval						Period of Performance From 02/28/2013 To 09/25/2013				
Comments:										
<div style="display: flex; justify-content: space-between;"> <input type="checkbox"/> Superfund Accounting and Appropriations Data <input checked="" type="checkbox"/> Non-Superfund </div>										
Note: To report additional accounting and appropriations data use EPA Form 1900-69A.										
SFO (Max 2) <input type="checkbox"/>										
Line	DCN (Max 6)	Budget/FY (Max 4)	Appropriation Code (Max 6)	Budget Org/Code (Max 7)	Program Element (Max 9)	Object Class (Max 4)	Amount (Dollars)	(Cents)	Site/Project (Max 8)	Cost Org/Code (Max 7)
1										
2										
3										
4										
5										
Authorized Work Assignment Ceiling										
Contract Period:		Cost/Fee: \$0.00				LOE: 0				
09/26/2012 To 09/25/2013										
This Action:		\$23,498.00				244				
Total:		\$23,498.00				244				
Work Plan / Cost Estimate Approvals										
Contractor WP Dated: 03/27/2013		Cost/Fee: \$23,498.00				LOE: 244				
Cumulative Approved:		Cost/Fee: \$23,498.00				LOE: 244				
Work Assignment Manager Name Gary Russo <div style="display: flex; justify-content: space-between;"> <div>_____</div> <div>_____</div> </div> <div style="display: flex; justify-content: space-between;"> <div>(Signature)</div> <div>(Date)</div> </div>						Branch/Mail Code:				
						Phone Number 202-566-1335				
						FAX Number:				
Project Officer Name Meghan Hessenauer <div style="display: flex; justify-content: space-between;"> <div>_____</div> <div>_____</div> </div> <div style="display: flex; justify-content: space-between;"> <div>(Signature)</div> <div>(Date)</div> </div>						Branch/Mail Code:				
						Phone Number: 202-566-1040				
						FAX Number:				
Other Agency Official Name <div style="display: flex; justify-content: space-between;"> <div>_____</div> <div>_____</div> </div> <div style="display: flex; justify-content: space-between;"> <div>(Signature)</div> <div>(Date)</div> </div>						Branch/Mail Code:				
						Phone Number:				
						FAX Number:				
Contracting Official Name Brad Heath <div style="display: flex; justify-content: space-between;"> <div>_____</div> <div>_____</div> </div> <div style="display: flex; justify-content: space-between;"> <div>(Signature)</div> <div>(Date)</div> </div>						Branch/Mail Code:				
						Phone Number: 513-487-2352				
						FAX Number:				

EPA United States Environmental Protection Agency Washington, DC 20460 Work Assignment						Work Assignment Number 0-46				
						<input type="checkbox"/> Other <input type="checkbox"/> Amendment Number:				
Contract Number EP-C-12-021			Contract Period 09/26/2012 To 09/25/2013 Base <input checked="" type="checkbox"/> Option Period Number			Title of Work Assignment/SF Site Name INC Visioneering Support				
Contractor EASTERN RESEARCH GROUP, INC.					Specify Section and paragraph of Contract SOW See PWS					
Purpose: <input checked="" type="checkbox"/> Work Assignment <input type="checkbox"/> Work Assignment Close-Out <input type="checkbox"/> Work Assignment Amendment <input type="checkbox"/> Incremental Funding <input type="checkbox"/> Work Plan Approval						Period of Performance From 08/01/2013 To 09/25/2013				
Comments:										
<div style="display: flex; justify-content: space-between;"> <input type="checkbox"/> Superfund Accounting and Appropriations Data <input checked="" type="checkbox"/> Non-Superfund </div>										
Note: To report additional accounting and appropriations data use EPA Form 1900-69A.										
SFO (Max 2) <input type="checkbox"/>										
Line	DCN (Max 6)	Budget/FY (Max 4)	Appropriation Code (Max 6)	Budget Org/Code (Max 7)	Program Element (Max 9)	Object Class (Max 4)	Amount (Dollars)	(Cents)	Site/Project (Max 8)	Cost Org/Code (Max 7)
1										
2										
3										
4										
5										
Authorized Work Assignment Ceiling										
Contract Period:		Cost/Fee:			LOE:					
09/26/2012 To 09/25/2013										
This Action:										
Total:										
Work Plan / Cost Estimate Approvals										
Contractor WP Dated:				Cost/Fee:			LOE:			
Cumulative Approved:				Cost/Fee:			LOE:			
Work Assignment Manager Name Tia Groves <div style="display: flex; justify-content: space-between;"> <div>_____ (Signature)</div> <div>_____ (Date)</div> </div>							Branch/Mail Code: Phone Number 202-564-5709 FAX Number:			
Project Officer Name Meghan Hessenauer <div style="display: flex; justify-content: space-between;"> <div>_____ (Signature)</div> <div>_____ (Date)</div> </div>							Branch/Mail Code: Phone Number: 202-566-1040 FAX Number:			
Other Agency Official Name <div style="display: flex; justify-content: space-between;"> <div>_____ (Signature)</div> <div>_____ (Date)</div> </div>							Branch/Mail Code: Phone Number: FAX Number:			
Contracting Official Name Brad Heath <div style="display: flex; justify-content: space-between;"> <div>_____ (Signature)</div> <div>_____ (Date)</div> </div>							Branch/Mail Code: Phone Number: 513-487-2352 FAX Number:			

**PERFORMANCE WORK STATEMENT
CONTRACT EP-C-12-021
WORK ASSIGNMENT 0-46**

TITLE: Interagency Nutrient Challenge Visioneering Support

WORK ASSIGNMENT MANAGER (WAM)

Tia Groves
US EPA ORD/IO (8101R)
Ronald Reagan Building, Room 41233
1200 Pennsylvania Avenue, NW
Washington, DC
Phone: 202-564-5709
groves.tia@epa.gov

PERIOD OF PERFORMANCE: August 1, 2013 through September 25, 2013

BACKGROUND

Excess nitrogen (N) and/or phosphorus (P) in waterways is a critical problem in the United States and around the world. Excess nutrients cause overgrowth of algae, leading to harmful algal blooms, hypoxia, drinking water contamination, and subsequent productivity and economic losses. Federal and state agencies and the private sector have been struggling to combat nutrient pollution for decades.

In an effort to catalyze technological advances and fresh solutions to issues of nutrient pollution in waterways, EPA in partnership with other organizations will work to develop a series of innovative prize competitions. Innovation prizes have proven transformative in addressing tough challenges faced by different generations, from the Longitude Prize solution for global ocean navigation to the recent development of commercial space flight. Prizes are especially effective in areas where science and technology advances have been made, but where these advances have not been coordinated across diverse disciplines to focus on a specific problem area.

For nutrient pollution, the initial Federal role will be to coordinate across the suite of stakeholders and potential partners to identify nutrient pollution intervention opportunities and the state of the science for each, along with those opportunities that are most amenable to a prize format. To aid in this coordination and the development of future prizes, EPA, along with the Office of Science and Technology Policy, will plan a Visioneering meeting. This meeting will convene a number of technical experts, the logistics of which are discussed below.

PURPOSE OF THE VISIONEERING MEETING

Current Federal engagement in the realm of nutrient pollution and management builds on the known interests and efforts of private sector philanthropists in addressing nutrient pollution,

most notable of which are the development of a \$10M Florida Everglades Foundation phosphorus capture prize and a \$1M Tulane University Water Prize to mitigate nitrogen-driven hypoxia in the Gulf of Mexico.

In order to coordinate these efforts and identify additional areas for research and prizes, EPA will organize an OSTP-sponsored prize design Visioneering meeting. The Visioneering meeting will summarize gaps and opportunities in today's science, technology, and community-based solutions, moving toward the development of one or more nutrient prizes. This will be undertaken in collaboration with partners and stakeholders, and supported by experts in prize design. The visioneering meeting will be in Washington DC, will be a one day meeting and will include 15 – 25 experts, plus facilitators, with an emphasis on novel expertise and interest across the spectrum of technological and social challenge opportunities. Existing and potential future prize partners and philanthropic institutions will be encouraged to build on this opportunity as they advance their respective nutrient prizes. Federal and state agencies will be engaged to contribute technical expertise and facilities support.

The Visioneering meeting will serve to initiate and stimulate Federal engagement in nutrient pollution prizes, with a view toward ongoing involvement in and support of existing activities, potential sponsorship of supplementary nutrient pollution research and/or prize opportunities, and opportunities for implementing results and broadening adoption to enhance impact.

SCOPE OF WORK

The Contractor shall liaise with the EPA as well as with InnoCentive (hereby referred to as "Prize Expert"), a challenge management company with expertise in competitive prize design, on the planning and execution of the Visioneering meeting. Specifically, the Contractor shall work with the Prize Expert to develop a process design agenda for the Visioneering meeting, regulate the overall participant mix and group dynamics, and integrate subject matter background into the Visioneering meeting in a way that informs but does not constrain the discussion. Below are the major tasks to be performed by the Contractor for this PWS.

TASKS

0. Program management:

The Contractor shall develop a work plan describing the necessary steps and estimated hours to complete each of the tasks included in this work assignment. The work plan shall also include a list of the key personnel to participate in the work assignment. Additionally, the contractor shall provide an estimate of all direct costs (i.e. computer costs, transcription, etc.) that are anticipated under this work assignment.

The Contractor shall prepare and deliver monthly progress reports to the Work Assignment Manager, Technical Lead, and Project Officer. These reports shall list, by task, the amount of work completed, and should include a table of hours by personnel for each task. The contractor shall inform the WAM, Technical Lead, and PO in writing when 50%, 75%, and 90% of the allocated hours and dollars have been expended.

TASK 0 – DELIVERABLES	Due Date
Work Plan	In accordance with contract requirements
Progress Reports	Monthly

I. Pre-meeting:

- a. The Contractor shall, in consultation with the EPA and the Prize Expert, recommend a list of diverse experts for participation in the Visioneering meeting, from which a list of 25 – 30 experts will be chosen in consultation with the Prize Expert, EPA, and Federal liasons.
- b. The Contractor shall initiate bi-weekly calls with the Federal interagency work group on nutrient prizes coordinated by OSTP for planning, coordination and communication in advance of the Visioneering meeting. The calls will last 1 hour each, and the Contractor shall take notes and distribute them after the call. The Contractor shall supplement the work group with other non-Federal partners as needed to optimize task completion, to be done in consultation with EPA and the Prize Expert.
- c. The Contractor shall conduct phone interviews with the identified experts in advance of the Visioneering meeting. The content for the phone interviews shall be developed by the Contractor with input from EPA and the Prize Expert, and the results from these interviews shall be compiled and shared with the interagency team in advance of the Visioneering meeting. The intent of the calls is to familiarize each of the experts with the purpose of the meeting, provide them with an opportunity to ask questions, learn about their priorities going into the meeting and identify any outstanding issues.
- d. The Contractor shall, in advance of the meeting, conduct 3-4 webinars with stakeholder groups that will be identified by EPA. The webinars will each last for 1 hour. The Contractor shall develop materials for the webinars, including a PowerPoint presentation. The webinar will serve as an opportunity to inform stakeholders about the upcoming meeting, to answer any questions they may have, and to enlist interest in outcomes and follow-up after the visioneering exercise. Representatives from Federal Agencies will participate in the calls. The Contractor shall handle the logistics of setting up and running the calls, and shall summarize the results of the calls and provide them to the EPA.
- e. The Contractor shall prepare a summary (no longer than 10 pages) and annotated bibliography of major documents and roadmaps pertaining to the state of emerging and innovative art/science/technology for the management and removal of nutrients from multiple sources. The focus shall be on reactive nitrogen and mixed nitrogen and phosphorus sources, along with a brief summary of the phosphorus recovery challenge already prepared for the Everglades Foundation by Innocentive. The

Contractor shall also prepare a summary document of observations regarding the social issues that, where evident, form the backdrop for the roll-out of new ideas pertaining to nutrient pollution (as extracted from the interviews, webinars, and, where available, as embedded in documents reviewed for the annotated bibliography). In addition, the Contractor shall summarize significant expenditures made by the federal government on nutrient management/removal issues (if available). Documents discussing major international nutrient management/removal innovations should be included where easily available.

- f. The Contractor, with input from EPA, shall handle the logistics of the Visioneering meeting, including; securing the location, arranging travel and accommodation for invited experts in a manner that is consistent with Federal travel guidelines, and distributing materials in advance of the meeting. The contractor shall also participate in the Visioneering meeting.
- g. The Contractor, with input from EPA, shall prepare communication materials for use in the planning and completion of future nutrient challenge work as well as work in other related areas.

II. Post Meeting

The Contractor shall work with the EPA and Prize Expert to support the development of up to three (3) challenges. The Prize Expert will have the lead on this task, with the Contractor providing technical support and subject matter expertise. This shall include:

- a.) Providing subject matter expertise, including ground-truthing all challenge ideas with experts/stakeholders, consulting relevant literature, and otherwise ensuring that all challenge ideas represent fruitful exploration areas in the field of nutrient management/removal, and;
- b.) Advising on the communication of marketing strategies for each challenge given the relevant stakeholder audiences.

III. Quality Assurance

In order to ensure the quality of data collected under this statement of work, the Contractor shall adhere to the following quality assurance guidelines:

- a.) **Document collection and the preparation of summary documents:** The Contractor shall only consult peer-reviewed literature, government documents, and data directly collected during interviews, webinars, and phone calls with subject matter experts in the preparation of all summary documents. In any case where there is uncertainty surrounding the permissibility of a particular document or dataset, the Contractor shall work with EPA to assess that document/dataset on a case-by-case basis. Exceptions are not to be made at the Contractor's discretion.

- b.) **Selection of subject matter experts for meeting participation:** Subject matter experts selected for participation in the Visioneering meeting should have significant professional and/or research experience in one of the following fields; nutrient pollution, soil chemistry, groundwater hydrology, agriculture, environmental engineering, fertilizer production, crop science, social science (including anthropology), or any other field that may relate to solutions to the issue of nutrient pollution in waterways.

DELIVERABLES AND SCHEDULE

1. **Work Plan.** Submitted in accordance with contract requirements. The work plan shall also include a list of the key personnel that are expected to participate in each task.
2. **Summary of calls with meeting participants.** This document, not to exceed ten (10) pages, will summarize the participants' priorities going into the meeting and identify any outstanding issues. The summary will be due 10 days after all calls are completed.
3. **Nutrient issue summary and annotated bibliography** of major documents and roadmaps pertaining to the state of emerging and innovative art/science/technology for the management and removal of nutrients from multiple sources. This document is not to exceed ten (10) pages, and will be due 30 days after the work assignment begins. After final review by the WAM, this document shall be sent out to participants in advance of the meeting. The Contractor shall also circulate this document to the OSTP-coordinated Federal interagency work group to allow for comments and supplementation, and shall revise the document accordingly.
4. **Summary document of observations regarding social issues that form the backdrop for roll-out of new ideas pertaining to nutrient pollution.** This document, no to exceed ten (10) pages, will use information extracted from interviews, webinars, and (where available) embedded in documents reviewed for completion of the annotated bibliography. The summary document is due 30 days after the work assignment begins. After final review by the WAM, this document shall be sent out to participants in advance of the meeting. The Contractor shall also circulate this document to the OSTP-coordinated Federal interagency work group to allow for comments and supplementation, and shall revise the document accordingly.
5. **Webinars** – the contractor shall hold no more than five (5) webinars in advance of the meeting. Webinars shall be completed 10 business days in advance of the meeting.

Travel - EPA anticipates the need for non-local travel by the contractor employees and/or subcontractors to support the scope of this work assignment. The contractor will provide specific travel details and costs in a request for travel approval submitted for WAM review and Project Officer (PO) signature before each trip occurs (as specified by the contract per clause H.32).

Confidential Business Information - The contractor shall, at all times, adhere to Confidential

Business Information (CBI) procedures when handling industry information. The contractor shall manage all reports, documents, and other materials and all draft documents developed under this work assignment in accordance with the procedures set forth in the Office of Science and Technology Confidential Business Information (OST-CBI) Application Security Plan (June 10, 2003), or its successor approved plans.

Meetings - To avoid the perception that contractor personnel are EPA employees, contractor personnel shall be clearly identified as independent contractors of EPA when participating in events with outside parties or visiting field sites.

Limitation of Contractor Activities - The contractor shall submit drafts of all deliverables to the WAM for review prior to submission of the final product. The contractor shall incorporate all WAM comments into all final deliverables, unless otherwise agreed upon by the WAM. The contractor shall adhere to all applicable EPA management control procedures as implemented by the Contracting Officer (CO), Project Officer (PO), and WAM.

Reporting Requirements - Major technical reports shall be subject to internal contractor peer review by an expert(s) not directly involved in the mainstream Work Assignment tasks. Deliverables will be prepared with proper adherence to EPA style and format requirements.

Management Controls - Technical direction shall be issued in writing by the WAM (as applicable). Periodic meetings between the WAM and Contractor work assignment managers are encouraged to discuss any questions that may arise during performance or completion of this work assignment. At the WAM's discretion, these meetings may occur via phone, formal teleconference or video conference. The Contractor shall document these meetings and submit copies of all correspondences to the WAM.

The Contractor shall meet with the WAM to present and discuss the work plan for this work assignment before it is approved by the EPA CO. The duration of this work assignment is from date of issuance through September 25, 2013.

Guidance Regarding Conferences - No single event under this Work Assignment is anticipated to exceed \$20,000. The Contractor shall immediately notify the EPA Contracting Officer, PO and WAM of any anticipated event involving support for a meeting, conference, workshop, symposium, retreat, seminar or training that may potentially incur \$20,000 or more in cost during performance. Conference expenses are all direct and indirect costs paid by the government and include any associated authorized travel and per diem expenses, room charges for official business, audiovisual use, light refreshments, registration fees, ground transportation and other expenses as defined by the Federal Travel Regulations. All outlays for conference preparation should be included, but the federal employee time for conference preparation should not be included. After notifying EPA of the potential to reach this threshold, the Contractor shall not proceed with the task(s) until authorized to do so by the Contracting Officer.

EPA United States Environmental Protection Agency Washington, DC 20460 Work Assignment						Work Assignment Number 0-48				
						<input type="checkbox"/> Other <input type="checkbox"/> Amendment Number:				
Contract Number EP-C-12-021			Contract Period 09/26/2012 To 09/25/2014 Base <input checked="" type="checkbox"/> Option Period Number			Title of Work Assignment/SF Site Name Peer Review of Acute Toxicity				
Contractor EASTERN RESEARCH GROUP, INC.					Specify Section and paragraph of Contract SOW See PWS					
Purpose: <input checked="" type="checkbox"/> Work Assignment <input type="checkbox"/> Work Assignment Close-Out <input type="checkbox"/> Work Assignment Amendment <input type="checkbox"/> Incremental Funding <input type="checkbox"/> Work Plan Approval						Period of Performance From 07/08/2013 To 09/25/2013				
Comments:										
<div style="display: flex; justify-content: space-between;"> <input type="checkbox"/> Superfund Accounting and Appropriations Data <input checked="" type="checkbox"/> Non-Superfund </div>										
Note: To report additional accounting and appropriations data use EPA Form 1900-69A.										
SFO <input type="checkbox"/> (Max 2)										
Line	DCN (Max 6)	Budget/FY (Max 4)	Appropriation Code (Max 6)	Budget Org/Code (Max 7)	Program Element (Max 9)	Object Class (Max 4)	Amount (Dollars)	(Cents)	Site/Project (Max 8)	Cost Org/Code (Max 7)
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Authorized Work Assignment Ceiling										
Contract Period:		Cost/Fee:			LOE:					
09/26/2012 To 09/25/2014										
This Action:										
Total:										
Work Plan / Cost Estimate Approvals										
Contractor WP Dated:				Cost/Fee:			LOE:			
Cumulative Approved:				Cost/Fee:			LOE:			
Work Assignment Manager Name Luis Cruz <div style="display: flex; justify-content: space-between;"> <div>_____</div> <div>_____</div> </div> <div style="display: flex; justify-content: space-between;"> <div>(Signature)</div> <div>(Date)</div> </div>							Branch/Mail Code:			
							Phone Number 202-566-1095			
							FAX Number:			
Project Officer Name Meghan Hessenauer <div style="display: flex; justify-content: space-between;"> <div>_____</div> <div>_____</div> </div> <div style="display: flex; justify-content: space-between;"> <div>(Signature)</div> <div>(Date)</div> </div>							Branch/Mail Code:			
							Phone Number: 202-566-1040			
							FAX Number:			
Other Agency Official Name Shirley Harrison <div style="display: flex; justify-content: space-between;"> <div>_____</div> <div>_____</div> </div> <div style="display: flex; justify-content: space-between;"> <div>(Signature)</div> <div>(Date)</div> </div>							Branch/Mail Code:			
							Phone Number: 202-566-1107			
							FAX Number:			
Contracting Official Name Brad Heath <div style="display: flex; justify-content: space-between;"> <div>_____</div> <div>_____</div> </div> <div style="display: flex; justify-content: space-between;"> <div>(Signature)</div> <div>(Date)</div> </div>							Branch/Mail Code:			
							Phone Number: 513-487-2352			
							FAX Number:			

**PERFORMANCE WORK STATEMENT
CONTRACT EP-C-12-021
WORK ASSIGNMENT 0-48**

Title: Peer Review of Acute Toxicity Testing of Freshwater Mussels Species Exposed to NaCl: Glochidia and Juveniles

Period of Performance: July 8, 2013 through September 25, 2013

Work Assignment Manager:

Luis Cruz
Health and Ecological Criteria Division 4304T
Office of Science and Technology
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, NW
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Phone 202-566-1095

Courier address:

Room 5233GG, EPA Connecting Wing
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Washington, DC 20004

Alternate Work Assignment Manager:

Lisa Huff
Health and Ecological Criteria Division (MC 4304T)
Office of Science and Technology
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue
Phone 202-566-0787

Background:

The Environmental Protection Agency (EPA) has a congressional mandate to develop and publish criteria for water quality to identify effects of pollutants on aquatic life and human health under 304(a)(1) of the Clean Water Act. EPA is also responsible for adopting criteria under this section for toxic pollutants listed in section 307(a)(1) of the Act, also known as EPA's priority pollutants. As part of this authority the Agency has been working to revise and update the aquatic life criteria for chloride.

Toxicity data has shown that freshwater unionid mussels are sensitive to exposure to NaCl. However there are questions related to the relative sensitivity of different life stages (glochidia, juveniles) to the effects of NaCl. Further, the effect of ambient water hardness on the toxicity of chloride is an area of uncertainty. EPA is undertaking this work assignment to provide a focused, objective evaluation requesting external peer review of specific toxicity results from freshwater

unionid mussel glochidia exposed to NaCl at varying water hardness concentrations, and juvenile mussels to a range of concentrations of NaCl.

Expert peer review is an important component of the scientific process. The criticism, suggestions and new ideas provided by the external peer reviewers should stimulate creative thought, strengthen the interpretation of the produced material, and confer credibility on the product based on the latest science. The intent is for comprehensive peer review to yield best science and product acceptance within the scientific and stakeholder communities.

Under this work assignment the contractor shall arrange for an expert peer review to evaluate toxicity test results and interpretation of the following materials:

(1) Preliminary summary of acute water-only sodium chloride toxicity testing with glochidia of fatmucket (*Lampsilis siliquoidea*) in different waters. Ning Wang, Chris Ivey, and Chris Ingersoll. Columbia Environmental Research Center (CERC), U.S. Geological Survey, Columbia, MO 65201. Date: May 31, 2013.

(2) Preliminary summary of acute water-only sodium chloride toxicity tests conducted with juvenile freshwater mussels. Ning Wang, Chris Ivey, Chris Ingersoll. Columbia Environmental Research Center (CERC), U.S. Geological Survey, Columbia, MO 65201. Date: May 31, 2013.

TASKS:

Task 1: Prepare a Work Plan

The contractor shall develop a work plan, consistent with the Agency Peer Review Policy procedures outlined in the following publication, Science Policy Council Handbook - Peer Review (EPA/100/B-06/002, version dated June 2006, and the Addendum to the Peer Review Handbook), which can both be found at <http://www.epa.gov/peerreview/>, to address all tasks in this work assignment.

The contractor shall develop a work plan to address the requested work. The work plan shall describe the steps that will be taken by the contractor to provide support for conducting the external peer review, including the selection of peer reviewer candidates, evaluating potential conflict of interest of the candidates, distributing documents and references to reviewers, establishing schedules, and submitting the peer review report to EPA WAM. The work plan shall include a detailed administrative schedule and a list of the key individuals who will be involved in the management aspects of the project.

Task 2: Arrange for Peer Reviewers

The objective of this task is to arrange for the selection of candidates to independently review two major toxicity studies as presented under Tasks 2a (glochidia exposed to NaCl at a range of water hardness concentrations) and 2b (juvenile mussels exposed to NaCl). The contractor will arrange for the participation of 5 peer reviewers. The reviewers will provide independent,

external peer review of the documents for scientific soundness in the methods, results and analysis of the data.

Many freshwater unionid mussel species are threatened or endangered in North America and current research indicates mussels are sensitive to NaCl exposure. The EPA commissioned several toxicity studies with freshwater mussels. One study investigated the response of mussel glochidia to NaCl exposure at a range of water hardness concentrations. Another study investigated the response of juvenile mussels to NaCl exposure. For this task, the peer reviewers will review and evaluate the documents listed under Materials, based on the referenced materials and their expertise, for scientific soundness in aquatic toxicity testing and their knowledge of the EPA aquatic life criteria derivation process.

For this task the reviewers will bring expertise gained from a wide variety of backgrounds and experiences including academia, industry, government and non government organizations. The expertise requirement for the peer review panel includes chemistry, aquatic toxicology, ecotoxicology, and statistics. Knowledge of EPA's 1985 *Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses* (Stephan et al. 1985) is a valuable asset. Not any one of the reviewers must be an expert in all the listed areas, but the overall panel expertise must include knowledge encompassing the above mentioned areas. The contractor will submit a draft report of the reviewers' comments within 1 month of the time of initiation of the peer review task and providing the reviewers with the necessary materials.

The process for assembling peer reviewers is intended to allow the contractor to make use of the WAM's knowledge of potentially useful reviewers while avoiding the possibility or even the appearance that EPA could direct the selection of peer reviewers to generate a favorable review.

Hence, the WAM may provide the contractor with an alphabetical list of possible candidate peer reviewers for consideration for the review panel.* The contractor may combine the EPA's list with the contractor's own compilation of possible reviewers, but is under no obligation to consider it. EPA's list represents persons that the WAM believes may have suitable expertise in the area, and is provided only to assist the contractor compiling a list of potential candidates. The contractor will select the peer reviewers independently.

EPA peer review policy restricts use of reviewers that are providing continuing advice to the Agency on the development of the material under review. For the peer review, authors of such published data are not necessarily to be excluded from the panel, where the validity of the original measurements is not in question. However, particularly where various interpretations of data are in contention, the known proponents of such interpretations are not suitable peer reviewers. The WAM will assist the contractor in identifying such potential problems.

From its list of candidates, the contractor shall select five reviewers based on expertise, willingness, availability and independence from primary advocacy of particular viewpoints upon which EPA is requesting review.

* The term "panel" is used here *without* implying that the contractor is to make any arrangement for the individual reviewers to attempt consensus.

In making the final selection, the contractor shall consider the overall balance of the panel. In order to maximize the potential that all significant issues will be aired and addressed, the contractor should try to assure that the selected panel represents a broad range of backgrounds.

The contractor shall inform the WAM of its final selection and its readiness to begin the review. When the contractor indicates readiness to begin review, the WAM will provide the final version of the charge, the final version of documents to be reviewed, and any supporting reference material.

Peer reviewers should maintain the confidentiality of the product, perform the review in a timely manner, and be unbiased and objective. These products should not be released publicly by the reviewers.

Task 2a: Peer review of toxicity tests on glochidia exposed to NaCl at a range of water hardness concentrations

Title: Preliminary summary of acute water-only sodium chloride toxicity testing with glochidia of fatmucket (*Lampsilis siliquoidea*) in different waters. Ning Wang, Chris Ivey, and Chris Ingersoll. Columbia Environmental Research Center (CERC), U.S. Geological Survey, Columbia, MO 65201. Date: May 31, 2013.

A study commissioned by the EPA investigated the response of mussel glochidia to NaCl exposure at a range of water hardness concentrations. A source of uncertainty is the effect of water hardness on the toxicity of NaCl to glochidia. Previous studies have indicated that glochidia are sensitive in acute 24-h exposures to NaCl (Bringolf et al. 2007, Valenti et al. 2007, Cope et al. 2008, Gillis et al. 2011). However, the effect concentrations varied widely within a species between different tests under similar conditions, or within a species tested in different water compositions across different hardness concentrations of reconstituted waters or various field-collected waters (see Gillis et al. 2011). As a result of the variability between test conditions and results, it is not clear what is the effect of water hardness concentration on the glochidia response to NaCl exposure.

Objectives for the study were to confirm the acute effect of NaCl on glochidia of fatmucket (*Lampsilis siliquoidea*) in ASTM reconstituted moderately hard water (hardness about 100 mg/L as CaCO₃) used in the tests conducted by Gillis (2011). A second objective was to evaluate the influence of water hardness on NaCl toxicity to fatmucket glochidia in the CERC (Columbia Environmental Research Center, USGS, Columbia MO.) diluted well water (50, 100, 200, and 280 mg/L hardness).

Task 2b: Peer review of toxicity tests on juvenile freshwater mussels exposed to NaCl.

Title: Preliminary summary of acute water-only sodium chloride toxicity tests conducted with juvenile freshwater mussels. Ning Wang, Chris Ivey, Chris Ingersoll. Columbia Environmental Research Center (CERC), U.S. Geological Survey, Columbia, MO 65201. Date: May 31, 2013.

This study investigated the acute response of juvenile mussels from different species to NaCl exposure. The test was conducted using two water formulations, ASTM reconstituted hard water (160-180 mg/L) following ASTM 2012b and CERC diluted well water (100 mg/L hard water).

Task 3: Obtain the Peer Review of document submitted

The contractor shall instruct the selected peer reviewers to undertake the review. The contractor shall provide each peer reviewer with a copy of the document(s) under review, a copy of the charge questions and copies of any reference materials listed below under section **Materials**.

The contractor should inform the peer reviewers that they should maintain the confidentiality of the product/documents under review and the documents should not be released publicly by the reviewers.

The contractor shall inform the EPA WAM of any requests from reviewers for additional supporting reference material, and shall transmit back to the reviewers any such material as the EPA WAM is able to provide.

The contractor shall monitor the peer reviewers' progress to assure timely completion. Upon obtaining the comments from the peer reviewers, the contractor shall prepare a draft Expert Panel report to be submitted to the EPA WAM. This draft report must include a summary of the background/purpose of the peer review, the charge questions, identification of the peer reviewers names and affiliations, the individual peer reviewers' responses to the charge questions, and a general summary of overlap or agreement and/or differences across the individual peer reviewer's comments with respect to the charge questions, with the recognition that these are individual peer reviews of the document, not intended to seek or obtain consensus. If requested by the EPA WAM, the contractor shall transmit a copy of each peer reviewer's comments (uncollated) as soon as they are available.

The EPA WAM will review the draft to determine whether there are any ambiguities that need clarification. When the EPA WAM indicates that there are no issues about clarity (reviewers' potential misunderstandings of EPA intentions on critical items under review, or EPA's uncertainties about the meaning of particular review comments), the contractor shall submit the peer review final report in paper and in electronic form.

Charge Questions

The EPA commissioned toxicity testing on freshwater unionid mussel glochidia and juveniles, which appear to be sensitive to NaCl exposure. Derivation of water quality criteria for chloride is based on toxicity data with relevant species of interest. Toxicity data for sensitive species have the potential to affect the overall acute and chronic values derived. The toxicity tests are being evaluated to determine the acute effects of NaCl to glochidia and the effects of water hardness on NaCl toxicity, as well as the effects of NaCl exposure to juvenile mussels.

Charge Questions for Glochidia Studies (Task 2a)

Toxicity tests on freshwater unionid mussels indicate that glochidia of these species are sensitive to NaCl exposure. However some issues remain as to the relative magnitude of the sensitivity between life stages, among different species, and the effects of water hardness on NaCl toxicity.

- 1) Are the methods and toxicity tests described in the document(s) scientifically sound? If not, please provide details of issues with the specific study.
- 2) Does the study design appropriately support scientific analysis of: (1) the acute effects of NaCl on mussel glochidia, and (2) the effects of water hardness on NaCl toxicity to the glochidia?
- 3) Are the results and conclusions appropriately interpreted from the data? If not, please provide details of alternative analyses and conclusions for the specific study.

Charge Questions for Juvenile Mussel Studies (Task 2b)

Toxicity tests on freshwater unionid mussels indicate that juveniles of these species are sensitive to NaCl exposure. However some issues remain as to the relative magnitude of the sensitivity among different species.

- 1) Are the methods and toxicity tests described in the document(s) scientifically sound? If not, please provide details of issues with the specific study.
- 2) Does the study design appropriately support scientific analysis of the effects of NaCl exposure on juvenile mussel of the five different species? If not, please provide details of issues with the specific study.
- 3) Are the results and conclusions appropriately interpreted from the data? If not, please provide details of alternative analyses and conclusions for the specific study.

SPECIAL REPORTING REQUIREMENTS

There are no special reporting requirements associated with this work assignment other than those specified by the Contract and in the above task statements.

CONFLICT OF INTEREST

The contractor shall follow Conflict of Interest procedures for Task Orders in accordance with Contract Clauses: Ordering Procedures, Organizational Conflicts of Interest (EPAAR 1552.209-71), Notification of Conflicts of Interest Regarding Personnel (EPAAR 1552.209-73), and "Conflict of Interest Evaluation for Task Orders.

NOTICE REGARDING GUIDANCE PROVIDED UNDER THIS WORK ASSIGNMENT:

Guidance is strictly limited to technical and analytical support. The contractor shall not engage in activities of an inherent governmental nature such as the following:

- (1) Formulation of Agency Policy
- (2) Selection of Agency priorities
- (3) Development of Agency regulations

Should the contractor receive any instruction from an EPA staff person that the contractor ascertains to fall into any of these categories or goes beyond the scope of the contract of work assignment, the contractor shall immediately contact the PO or TOPO.

There are no special reporting requirements associated with this work assignment other than those specified by the Contract and in the above task statements.

DELIVERABLES

- Task 1 Prepare work plan: In accordance with contract requirements.
- Task 2 Identify potential peer reviewer candidates and determine availability for task:
 Provide list of potential peer reviewers to WAM for consideration for
 breadth of skills 2 weeks after receipt of work assignment
- Task 2 Complete the final selection of peer reviewers
 1 week after receive approval of list of candidates from WAM
- Task 3 Submit peer review draft reports:
 Not later than July 30, 2013 or as determined via Technical Direction from
 WAM.
- Task 3 Submit peer review final reports:
 2 weeks after submittal of draft reports, and not later than August 15, 2013.

TRAVEL: No travel is anticipated under this work assignment.

Materials

(1) Preliminary summary of acute water-only sodium chloride toxicity testing with glochidia of fatmucket (*Lampsilis siliquoidea*) in different waters. Ning Wang, Chris Ivey, and Chris Ingersoll. Columbia Environmental Research Center (CERC), U.S. Geological Survey, Columbia, MO 65201. Date: May 31, 2013

This report includes (a) evaluation of acute 24-h toxicity of NaCl to glochidia of fatmucket (*Lampsilis siliquoidea*), and (b) effects of water hardness on NaCl toxicity in glochidia of fatmucket.

(2) Preliminary summary of acute water-only sodium chloride toxicity tests conducted with juvenile freshwater mussels. Ning Wang, Chris Ivey, Chris Ingersoll. Columbia Environmental Research Center (CERC), U.S. Geological Survey, Columbia, MO 65201. Date: May 31, 2013

Tests on acute exposure to NaCl conducted with juveniles from five freshwater mussel species.

EPA United States Environmental Protection Agency Washington, DC 20460 Work Assignment						Work Assignment Number 0-48				
						<input type="checkbox"/> Other <input type="checkbox"/> Amendment Number:				
Contract Number EP-C-12-021			Contract Period 09/26/2012 To 09/25/2014 Base <input checked="" type="checkbox"/> Option Period Number			Title of Work Assignment/SF Site Name Peer Review of Acute Toxicity				
Contractor EASTERN RESEARCH GROUP, INC.					Specify Section and paragraph of Contract SOW See PWS					
Purpose: <input checked="" type="checkbox"/> Work Assignment <input type="checkbox"/> Work Assignment Close-Out <input type="checkbox"/> Work Assignment Amendment <input type="checkbox"/> Incremental Funding <input checked="" type="checkbox"/> Work Plan Approval						Period of Performance From 07/08/2013 To 09/25/2013				
Comments:										
<div style="display: flex; justify-content: space-between;"> <input type="checkbox"/> Superfund Accounting and Appropriations Data <input checked="" type="checkbox"/> Non-Superfund </div>										
Note: To report additional accounting and appropriations data use EPA Form 1900-69A.										
SFO (Max 2) <input type="checkbox"/>										
Line	DCN (Max 6)	Budget/FY (Max 4)	Appropriation Code (Max 6)	Budget Org/Code (Max 7)	Program Element (Max 9)	Object Class (Max 4)	Amount (Dollars)	(Cents)	Site/Project (Max 8)	Cost Org/Code (Max 7)
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2										
3										
4										
5										
Authorized Work Assignment Ceiling										
Contract Period:		Cost/Fee: \$0.00				LOE: 0				
09/26/2012 To 09/25/2014										
This Action:		\$8,874.00				111				
Total:		\$8,874.00				111				
Work Plan / Cost Estimate Approvals										
Contractor WP Dated: 08/06/2013		Cost/Fee: \$8,874.00				LOE: 111				
Cumulative Approved:		Cost/Fee: \$8,874.00				LOE: 111				
Work Assignment Manager Name Luis Cruz <div style="display: flex; justify-content: space-between;"> <div>_____ (Signature)</div> <div>_____ (Date)</div> </div>						Branch/Mail Code:				
						Phone Number 202-566-1095				
						FAX Number:				
Project Officer Name Meghan Hessenauer <div style="display: flex; justify-content: space-between;"> <div>_____ (Signature)</div> <div>_____ (Date)</div> </div>						Branch/Mail Code:				
						Phone Number: 202-566-1040				
						FAX Number:				
Other Agency Official Name <div style="display: flex; justify-content: space-between;"> <div>_____ (Signature)</div> <div>_____ (Date)</div> </div>						Branch/Mail Code:				
						Phone Number:				
						FAX Number:				
Contracting Official Name Brad Heath <div style="display: flex; justify-content: space-between;"> <div>_____ (Signature)</div> <div>_____ (Date)</div> </div>						Branch/Mail Code:				
						Phone Number: 513-487-2352				
						FAX Number:				

EPA United States Environmental Protection Agency Washington, DC 20460 Work Assignment						Work Assignment Number 0-49				
						<input type="checkbox"/> Other <input type="checkbox"/> Amendment Number:				
Contract Number EP-C-12-021			Contract Period 09/26/2012 To 09/25/2014 Base <input checked="" type="checkbox"/> Option Period Number			Title of Work Assignment/SF Site Name Peer Review Acute Tox Mayfly				
Contractor EASTERN RESEARCH GROUP, INC.					Specify Section and paragraph of Contract SOW See PWS					
Purpose: <input checked="" type="checkbox"/> Work Assignment <input type="checkbox"/> Work Assignment Close-Out <input type="checkbox"/> Work Assignment Amendment <input type="checkbox"/> Incremental Funding <input type="checkbox"/> Work Plan Approval						Period of Performance From 07/08/2013 To 09/25/2013				
Comments:										
<div style="display: flex; justify-content: space-between;"> <input type="checkbox"/> Superfund Accounting and Appropriations Data <input checked="" type="checkbox"/> Non-Superfund </div>										
Note: To report additional accounting and appropriations data use EPA Form 1900-69A.										
SFO (Max 2) <input type="checkbox"/>										
Line	DCN (Max 6)	Budget/FY (Max 4)	Appropriation Code (Max 6)	Budget Org/Code (Max 7)	Program Element (Max 9)	Object Class (Max 4)	Amount (Dollars)	(Cents)	Site/Project (Max 8)	Cost Org/Code (Max 7)
1										
2										
3										
4										
5										
Authorized Work Assignment Ceiling										
Contract Period:		Cost/Fee:			LOE:					
09/26/2012 To 09/25/2014										
This Action:										
Total:										
Work Plan / Cost Estimate Approvals										
Contractor WP Dated:				Cost/Fee:			LOE:			
Cumulative Approved:				Cost/Fee:			LOE:			
Work Assignment Manager Name Luis Cruz <div style="display: flex; justify-content: space-between;"> <div>_____ (Signature)</div> <div>_____ (Date)</div> </div>							Branch/Mail Code: Phone Number 202-566-1095 FAX Number:			
Project Officer Name Meghan Hessenauer <div style="display: flex; justify-content: space-between;"> <div>_____ (Signature)</div> <div>_____ (Date)</div> </div>							Branch/Mail Code: Phone Number: 202-566-1040 FAX Number:			
Other Agency Official Name Shirley Harrison <div style="display: flex; justify-content: space-between;"> <div>_____ (Signature)</div> <div>_____ (Date)</div> </div>							Branch/Mail Code: Phone Number: 202-566-1107 FAX Number:			
Contracting Official Name Brad Heath <div style="display: flex; justify-content: space-between;"> <div>_____ (Signature)</div> <div>_____ (Date)</div> </div>							Branch/Mail Code: Phone Number: 513-487-2352 FAX Number:			

**PERFORMANCE WORK STATEMENT
CONTRACT EP-C-12-021
WORK ASSIGNMENT 0-49**

TITLE: Peer Review of Culture Methods and Acute Toxicity Testing of Mayfly, *Centroptilum triangulifer* exposed to NaCl.

PERIOD OF PERFORMANCE: July 8, 2013 through September 25, 2013

WORK ASSIGNMENT MANAGER:

Luis Cruz
Health and Ecological Criteria Division 4304T
Office of Science and Technology
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, NW
Washington, DC 20460
Phone 202-566-1095

Courier address:
Room 5233GG, EPA Connecting Wing
1201 Constitution Avenue, NW
Washington, DC 20004

ALTERNATE WORK ASSIGNMENT MANAGER:

Lisa Huff
Health and Ecological Criteria Division (MC 4304T)
Office of Science and Technology
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, NW
Washington, DC 20460
Phone 202-566-0787

BACKGROUND:

The Environmental Protection Agency (EPA) has a congressional mandate to develop and publish criteria for water quality to identify effects of pollutants on aquatic life and human health under 304(a)(1) of the Clean Water Act. EPA is also responsible for adopting criteria under this section for toxic pollutants listed in section 307(a)(1) of the Act, also known as EPA's priority pollutants. As part of this authority the Agency has been working to revise and update the aquatic life criteria for chloride.

Toxicity data and other information on the effects of NaCl to the mayfly *Centroptilum triangulifer* were obtained recently. However there are questions related to the suitability of this species for use in criteria derivation in part due to questions regarding culturing conditions (food quality and quantity) and survivability during testing. EPA is undertaking this work assignment

to provide a focused, objective evaluation requesting external peer review of the culturing methods developed and toxicity testing results and analysis utilizing the parthenogenic mayfly *C. triangulifer* exposed to NaCl.

Expert peer review is an important component of the scientific process. The criticism, suggestions and new ideas provided by the external peer reviewers should stimulate creative thought, strengthen the interpretation of the produced material, and confer credibility on the product based on the latest science. The intent is for comprehensive peer review to yield best science and product acceptance within the scientific and stakeholder communities.

Under this work assignment the contractor shall arrange for an expert peer review to evaluate toxicity test results and interpretation of the following materials:

(1) Progress on methods development and acute toxicity testing with *Centroptilum triangulifer* and study plan for development of full life-cycle test methods. David J. Soucek, Ph.D. Illinois Natural History Survey (INHS). Nov 7, 2012.

(2) Acute toxicity data for *Centroptilum triangulifer*. David J. Soucek, Illinois Natural History Survey (INHS). May 31, 2013.

TASKS:

Task 1: Prepare a Work Plan

The contractor shall develop a work plan, consistent with the Agency Peer Review Policy procedures outlined in the following publication, *Science Policy Council Handbook - Peer Review* (EPA/100/B-06/002, version dated June 2006, and the *Addendum to the Peer Review Handbook*), which can both be found at <http://www.epa.gov/peerreview/>, to address all tasks in this work assignment.

The contractor shall develop a work plan to address the requested work. The work plan shall describe the steps that will be taken by the contractor to provide support for conducting the external peer review, including the selection of peer reviewer candidates, evaluating potential conflict of interest of the candidates, distributing documents and references to reviewers, establishing schedules, and submitting the peer review report to EPA EPA WAM. The work plan shall include a detailed administrative schedule and a list of the key individuals who will be involved in the management aspects of the project.

Task 2: Arrange for Peer Reviewers

The object of this task is to arrange for the selection of candidates to independently review (a) culturing method developed, and (b) acute toxicity testing with the parthenogenic mayfly *Centroptilum triangulifer*. The contractor will arrange for the participation of 5 peer reviewers. The reviewers will provide independent, external peer review of the documents for scientific soundness in the methods, results and analysis of the data.

The mayfly is a species of aquatic invertebrate that has not been represented in criteria derivation to date due to lack of data. Recent toxicity testing indicates mayflies may be very sensitive to NaCl exposure. The EPA commissioned toxicity testing with the mayfly *Centropilum triangulifer*, including research investigating (a) culturing requirements (e.g., food quality and quantity) and nymph rearing methods, and (b) acute toxicity to NaCl exposure to this species. Although progress has been made toward developing standardized culturing methods by researchers, independent validation of the methods is vital for the accepted use of this species in toxicity testing. Developing toxicity testing methods with new and sensitive species is important to criteria derivation and aquatic life protection by increasing the number of species represented in the database. For this task, the peer reviewers will review and evaluate the documents listed under Materials, based on the referenced materials and their expertise, for scientific soundness in aquatic toxicity testing and their knowledge of the EPA aquatic life criteria derivation process.

For this task the reviewers will bring expertise gained from a variety of backgrounds and experiences including academia, industry, government and non government organizations. The expertise requirement for the peer review panel includes chemistry, aquatic toxicology, ecotoxicology, and statistics. Knowledge of EPA's 1985 *Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses* (Stephan et al. 1985) is a valuable asset. Not any one of the reviewers must be an expert in all the listed areas, but the overall panel expertise must include knowledge encompassing the above mentioned areas. The contractor will submit a draft report of the reviewers' comments within 1 month of the time of initiation of the peer review task and providing the reviewers with the necessary materials.

The process for assembling peer reviewers is intended to allow the contractor to make use of the EPA WAM's knowledge of potentially useful reviewers while avoiding the possibility or even the appearance of the possibility that EPA could arrange the selection to generate a favorable review.

Hence, the EPA WAM may provide the contractor with an alphabetical list of candidate peer reviewers for consideration for the review panel.* The contractor may combine the EPA's list with the contractor's own compilation of possible reviewers, but is under no obligation to consider it. EPA's list represents persons that the EPA WAM believes may have suitable expertise in the area, and is provided only to assist the contractor compiling a list of potential candidates. The contractor will select the peer reviewers independently.

EPA peer review policy restricts use of reviewers that are providing continuing advice to the Agency on the development of the material under review. For the peer review, authors of such published data are not necessarily to be excluded from the panel, where the validity of the original measurements is not in question. However, particularly where various interpretations of data are in contention, the known proponents of such interpretations are not suitable peer reviewers. The EPA WAM will assist the contractor in identifying such potential problems.

* The term "panel" is used here *without* implying that the contractor is to make any arrangement for the individual reviewers to attempt consensus.

From its list of candidates, the contractor shall select five reviewers based on expertise, willingness, availability and independence from primary advocacy of particular viewpoints upon which EPA is requesting review.

In making the final selection, the contractor shall consider the overall balance of the panel. In order to maximize the potential that all significant issues will be aired and addressed, the contractor should try to assure that the selected panel represents a broad range of backgrounds.

The contractor shall inform the EPA WAM of its final selection and its readiness to begin the review. When the contractor indicates readiness to begin review, the EPA WAM will provide the final version of the charge, the final version of documents to be reviewed, and any supporting reference material.

Peer reviewers should maintain the confidentiality of the product, perform the review in a timely manner, and be unbiased and objective. These products should not be released publicly by the reviewers.

Task 3: Obtain the Peer Review of document(s) submitted

The contractor shall instruct the selected peer reviewers to undertake the review. The contractor shall provide each peer reviewer with a copy of the document(s) under review, a copy of the charge questions and copies of any reference materials listed below under section **Materials**.

The contractor should inform the peer reviewers that they should maintain the confidentiality of the product/documents under review and the documents should not be released publicly by the reviewers.

The contractor shall inform the EPA WAM of any requests from reviewers for additional supporting reference material, and shall transmit back to the reviewers any such material as the EPA WAM is able to provide.

The contractor shall monitor the peer reviewers' progress to assure timely completion. Upon obtaining the comments from the peer reviewers, the contractor shall prepare a draft Expert Panel report to be submitted to the EPA WAM. This draft report must include a summary of the background/purpose of the peer review, the charge questions, identification of the peer reviewers names and affiliations, the individual peer reviewers' responses to the charge questions, and a general summary of overlap or agreement and/or differences across the individual peer reviewer's comments with respect to the charge questions, with the recognition that these are individual peer reviews of the document, not intended to seek or obtain consensus. If requested by the EPA WAM, the contractor shall transmit a copy of each peer reviewer's comments (uncollated) as soon as they are available.

The EPA WAM will review the draft to determine whether there are any ambiguities that need clarification. When the EPA WAM indicates that there are no issues about clarity (reviewers' potential misunderstandings of EPA intentions on critical items under review, or EPA's

uncertainties about the meaning of particular review comments), the contractor shall submit the peer review final report in paper and in electronic form.

Charge Questions

The mayfly is a species of aquatic invertebrate that has not been represented in criteria derivation to date due to lack of data. The EPA commissioned toxicity testing with the mayfly *C. triangulifer*, including research investigating (a) culturing requirements (e.g., food quality and quantity) and nymph rearing methods, and (b) acute toxicity to NaCl exposure to this species.. Derivation of water quality criteria for chloride is based on the best available toxicity data with relevant species of interest. Toxicity data for sensitive species have the potential to affect the overall acute and chronic values derived. Recent data show that the mayfly is a very sensitive species to the effects of NaCl (Lazorchak, J. et al., Soucek, D.). Since data on this species was not previously available, the new data may be potentially useful in criteria derivations but there are questions regarding culturing conditions, survivability and toxicity response during testing.

Questions

The development of culture methods and toxicity testing has provided data showing that the mayfly is potentially among the most sensitive species to NaCl exposure. Because data for this species has not been available or used in deriving aquatic life criteria, issues with culture methods (food quantity and quality) and acute toxicity testing were studied.

- a) Are the culture methods described in the document(s) scientifically sound? If not, please provide details of issues with the specific study.
- b) Does the study design appropriately support scientific analysis of: (1) culturing and rearing methods for the mayfly, and (2) acute toxicity testing of mayfly exposed to NaCl? If not, please provide details of issues with the specific study.
- c) Are the results and conclusions appropriately inferred from the data? If not, please provide details of alternative analyses and conclusions for the specific study.

SPECIAL REPORTING REQUIREMENTS

There are no special reporting requirements associated with this work assignment other than those specified by the Contract and in the above task statements.

CONFLICT OF INTEREST

The contractor shall follow Conflict of Interest procedures for Task Orders in accordance with Contract Clauses: Ordering Procedures, Organizational Conflicts of Interest (EPAAR 1552.209-71), Notification of Conflicts of Interest Regarding Personnel (EPAAR 1552.209-73), and “Conflict of Interest Evaluation for Task Orders”.

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Guidance is strictly limited to technical and analytical support. The contractor shall not engage in activities of an inherent governmental nature such as the following:

- (1) Formulation of Agency Policy
- (2) Selection of Agency priorities
- (3) Development of Agency regulations

Should the contractor receive any instruction from an EPA staff person that the contractor ascertains to fall into any of these categories or goes beyond the scope of the contract of work assignment, the contractor shall immediately contact the PO.

There are no special reporting requirements associated with this work assignment other than those specified by the Contract and in the above task statements.

DELIVERABLES

- | | |
|--------|--|
| Task 1 | Prepare work plan: In accordance with contract requirements. |
| Task 2 | Identify potential peer reviewer candidates and determine availability for task
Provide list of potential peer reviewers to EPA WAM for consideration for breadth of skills 2 weeks after receipt of work assignment. |
| Task 2 | Complete the final selection of peer reviewers, ready to begin review
1 week after receive approval of list of candidates from EPA WAM |
| Task 3 | Submit peer review draft reports:
Not later than July 30, 2013 or as determined via Technical Direction from WAM. |
| Task 3 | Submit peer review final reports:
2 weeks after submittal of draft reports, and not later than August 7, 2013. |

TRAVEL:

No travel is anticipated under this work assignment.

MATERIALS:

(1) **Progress on methods development and acute toxicity testing with *Centropilum triangulifer* and study plan for development of full life-cycle test methods.** David J. Soucek, Ph.D. Illinois Natural History Survey (INHS). Nov 7, 2012.

This document describes preliminary results with culturing and nymph rearing methods. It also describes preliminary results with acute toxicity testing exposing mayfly to NaCl.

(2) **Acute toxicity data for *Centroptilum triangulifer*.** David J. Soucek, Illinois Natural History Survey (INHS). May 31, 2013.

The purpose of this memorandum is to summarize the methods used and toxicity testing results of five 96-h acute chloride (Cl^-) with the parthenogenic mayfly, *Centroptilum triangulifer*.

EPA United States Environmental Protection Agency Washington, DC 20460 Work Assignment						Work Assignment Number 0-49				
						<input type="checkbox"/> Other <input type="checkbox"/> Amendment Number:				
Contract Number EP-C-12-021			Contract Period 09/26/2012 To 09/25/2014 Base <input checked="" type="checkbox"/> Option Period Number			Title of Work Assignment/SF Site Name Peer Review Acute Tox Mayfly				
Contractor EASTERN RESEARCH GROUP, INC.					Specify Section and paragraph of Contract SOW See PWS					
Purpose: <input checked="" type="checkbox"/> Work Assignment <input type="checkbox"/> Work Assignment Close-Out <input type="checkbox"/> Work Assignment Amendment <input type="checkbox"/> Incremental Funding <input checked="" type="checkbox"/> Work Plan Approval						Period of Performance From 07/08/2013 To 09/25/2013				
Comments:										
<div style="display: flex; justify-content: space-between;"> <input type="checkbox"/> Superfund Accounting and Appropriations Data <input checked="" type="checkbox"/> Non-Superfund </div>										
Note: To report additional accounting and appropriations data use EPA Form 1900-69A.										
SFO <input type="checkbox"/> (Max 2)										
Line	DCN (Max 6)	Budget/FY (Max 4)	Appropriation Code (Max 6)	Budget Org/Code (Max 7)	Program Element (Max 9)	Object Class (Max 4)	Amount (Dollars)	(Cents)	Site/Project (Max 8)	Cost Org/Code (Max 7)
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2										
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Authorized Work Assignment Ceiling										
Contract Period:		Cost/Fee: \$0.00		LOE: 0						
09/26/2012 To 09/25/2014										
This Action:		\$9,189.00		115						
Total:		\$9,189.00		115						
Work Plan / Cost Estimate Approvals										
Contractor WP Dated: 08/08/2013		Cost/Fee: \$9,189.00		LOE: 115						
Cumulative Approved:		Cost/Fee: \$9,189.00		LOE: 115						
Work Assignment Manager Name Luis Cruz <div style="display: flex; justify-content: space-between;"> <div>_____ (Signature)</div> <div>_____ (Date)</div> </div>						Branch/Mail Code: Phone Number 202-566-1095 FAX Number:				
Project Officer Name Meghan Hessenauer <div style="display: flex; justify-content: space-between;"> <div>_____ (Signature)</div> <div>_____ (Date)</div> </div>						Branch/Mail Code: Phone Number: 202-566-1040 FAX Number:				
Other Agency Official Name <div style="display: flex; justify-content: space-between;"> <div>_____ (Signature)</div> <div>_____ (Date)</div> </div>						Branch/Mail Code: Phone Number: FAX Number:				
Contracting Official Name Brad Heath <div style="display: flex; justify-content: space-between;"> <div>_____ (Signature)</div> <div>_____ (Date)</div> </div>						Branch/Mail Code: Phone Number: 513-487-2352 FAX Number:				

EPA United States Environmental Protection Agency Washington, DC 20460 Work Assignment						Work Assignment Number 0-50				
						<input type="checkbox"/> Other <input type="checkbox"/> Amendment Number:				
Contract Number EP-C-12-021			Contract Period 09/26/2012 To 09/25/2013 Base <input checked="" type="checkbox"/> Option Period Number			Title of Work Assignment/SF Site Name Managing Trash and Debris				
Contractor EASTERN RESEARCH GROUP, INC.					Specify Section and paragraph of Contract SOW See PWS					
Purpose: <input checked="" type="checkbox"/> Work Assignment <input type="checkbox"/> Work Assignment Close-Out <input type="checkbox"/> Work Assignment Amendment <input type="checkbox"/> Incremental Funding <input type="checkbox"/> Work Plan Approval						Period of Performance From 07/30/2013 To 09/25/2013				
Comments:										
<div style="display: flex; justify-content: space-between;"> <input type="checkbox"/> Superfund Accounting and Appropriations Data <input checked="" type="checkbox"/> Non-Superfund </div>										
Note: To report additional accounting and appropriations data use EPA Form 1900-69A.										
SFO (Max 2) <input type="checkbox"/>										
Line	DCN (Max 6)	Budget/FY (Max 4)	Appropriation Code (Max 6)	Budget Org/Code (Max 7)	Program Element (Max 9)	Object Class (Max 4)	Amount (Dollars)	(Cents)	Site/Project (Max 8)	Cost Org/Code (Max 7)
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Authorized Work Assignment Ceiling										
Contract Period:		Cost/Fee:			LOE:					
09/26/2012 To 09/25/2013										
This Action:										
Total:										
Work Plan / Cost Estimate Approvals										
Contractor WP Dated:				Cost/Fee:			LOE:			
Cumulative Approved:				Cost/Fee:			LOE:			
Work Assignment Manager Name Robert Benson <div style="display: flex; justify-content: space-between;"> <div>_____ (Signature)</div> <div>_____ (Date)</div> </div>							Branch/Mail Code: Phone Number 202-566-2954 FAX Number:			
Project Officer Name Meghan Hessenauer <div style="display: flex; justify-content: space-between;"> <div>_____ (Signature)</div> <div>_____ (Date)</div> </div>							Branch/Mail Code: Phone Number: 202-566-1040 FAX Number:			
Other Agency Official Name <div style="display: flex; justify-content: space-between;"> <div>_____ (Signature)</div> <div>_____ (Date)</div> </div>							Branch/Mail Code: Phone Number: FAX Number:			
Contracting Official Name Brad Heath <div style="display: flex; justify-content: space-between;"> <div>_____ (Signature)</div> <div>_____ (Date)</div> </div>							Branch/Mail Code: Phone Number: 513-487-2352 FAX Number:			

**PERFORMANCE WORK STATEMENT
CONTRACT EP-C-12-021
WORK ASSIGNMENT 0-50**

1. **Title:** Analysis of the Societal Costs of Managing Trash and Debris in the Aquatic Environment

2. **Work Assignment Manager (WAM):**

Robert Benson

Marine Pollution Control Branch/Oceans and Coastal Protection Division/Office of Wetlands,
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3. **Period of Performance:** July 30, 2013 to September 25, 2013

4. **Background:** Among the many water quality issues that EPA addresses is the problem of trash, litter, and debris that enters the aquatic environment. Trash has become a pervasive problem for oceans, coasts, and inland watersheds, causing aesthetic blight, but also ecological impacts and possibly human health effects as well. The costs of dealing with aquatic trash, in terms of clean-up cost and the economic impacts on local economies, can be severe.

Approximately 80% of aquatic trash comes from land-based sources. Trash on land has numerous pathways to aquatic ecosystems. Plastic is estimated to make up 60-80% of this waste stream. Given the land-based origins of the trash problem, EPA has developed a new program called Trash Free Waters (TFW). This program has been designed with a strong emphasis on helping states and localities reduce the volume of trash and debris that enters both freshwater and coastal ecosystems.

The TFW program is intended to support trash prevention and reduction initiatives by government agencies and non-governmental organizations at the Federal, state, and local levels. EPA intends to be a catalyst for states and localities to develop strategies to deal with trash and litter in more proactive ways, and in so doing, protect the environment, reduce their costs over the long term, and enhance their economies.

The TFW program has five elements, each of which addresses a factor that has been identified by many external constituent groups as important to help states and localities deal with trash more efficiently and cost-effectively. One element is to develop more credible data on the cost impacts of trash in the aquatic environment – costs to municipalities, businesses, and individual taxpayers.

This work assignment will address the issue of economic impacts from aquatic trash and debris.

5. **Objective:** The objective of this project is to create a credible, quantified analysis of (1) the societal costs of trash in the aquatic environment and (2) the economic benefits of trash prevention

and reduction. The analysis will review, compile, assess *existing* studies of trash management costs, trash and debris impacts on local and state economies, and potential savings from innovative approaches (i.e., technologies, processes, programs) to trash prevention and reduction.

The analysis also will seek to both consolidate and extrapolate available data to reach economically credible conclusions on aggregate costs and benefits associated with trash pollution, management, and proactive prevention at the national, regional, state, and municipal levels. The analysis will identify data gaps and analytical needs where credible conclusions cannot be drawn. Results will be presented in a white paper format. EPA will convene a panel of qualified experts to review and assess the white paper, with the ultimate goal of finalizing the paper and sharing it with the public.

6. Description of Tasks: Note that for purposes of this PWS, the term “aquatic trash” refers to trash, litter, and debris that has entered the aquatic environment, including freshwater ecosystems (rivers, lakes, streams, and bays) and coastal ecosystems (estuaries, beaches, and the marine environment). Note also that, in the event that unforeseen circumstances require changes in tasks, deliverables, or deliverable dates, the COR will amend the PWS to reflect such changes.

Task 1: Develop a work plan and cost proposal.

The Contractor shall develop a work plan describing the necessary steps and estimated hours and costs to complete each of the tasks specified in this work assignment. The work plan shall include plans for completion of all QA-related tasks, reviews, and reporting described in the Quality Management Plan customized for this contract and the Quality Assurance Project Plan, as specified in this work assignment. The work plan also shall identify all of the key personnel participating in this work assignment. The work plan shall be due in accordance with contract requirements.

The Contractor shall provide the following deliverable for Task 1:

TASK	DELIVERABLES	DUE DATE TO EPA
Task 1: Develop workplan and cost proposal	Workplan and Cost Proposal	In accordance with contract requirements.

Task 2: Comply with all Quality Assurance requirements.

The work to be performed by the Contractor under this work assignment involves the collection, generation, evaluation, analysis, and/or use of environmental data, and therefore requires the development of a QAPP before any work begins on such activities. The Contractor is required to take the following actions:

- The Contractor shall adhere to the Contract-level Quality Management Plan (QMP) customized for this contract in performing the services requested in this work assignment.
- The Contractor shall prepare and submit for EPA review a draft QAPP, including Standard Operating Procedures (SOPs) and checklists, documenting how quality

assurance (QA) and quality control (QC) will be applied to the generation, collection, evaluation, analysis and use of environmental data. The Contractor shall write the QAPP using the active voice.

- EPA will review the Contractor's draft QAPP and provide the Contractor with written approval or written comments. If comments are provided, the Contractor shall submit a revised QAPP that addresses those comments.
- The Contractor shall not perform any work that involves the generation, collection, evaluation, analysis, or use of environmental data until they have received written notification from the COR that EPA has approved the Contractor's QAPP.
- The Contractor shall provide sufficient detail in the QAPP to clearly describe the actions taken to meet quality assurance requirements, including but not limited to the following: objectives of the project supported by the work assignment; the type of data to be collected, generated, or used to support the project objectives; the quality objectives necessary to support the project objectives; and the QA and QC activities to be performed to ensure that any results obtained are documented and are of the type, quality, transparency, and reproducibility needed.
- The QAPP must be consistent with the *EPA Office of Water Quality Management Plan, February 2009, EPA 821-R-09-001*, <http://www.epa.gov/oamcinc1/1100002/attach9.pdf> and the *EPA Requirements for Quality Assurance Project Plans: EPA QA/R-5*, <http://www.epa.gov/quality/qs-docs/r5-final.pdf>.

Once the QAPP is approved by EPA, the Contractor shall comply with all QA/QC requirements set forth in the QAPP. The Contractor also shall comply with the following procedural requirements related to compliance with the QAPP:

- The Contractor shall notify the COR if they determine that changes to the QAPP are warranted (e.g., due to organizational changes, revised technical approaches, or other unforeseen circumstances).
- The Contractor shall provide written monthly reports of activities involving QA/QC performed during this work assignment. These monthly QA reports shall identify QA activities performed to comply with the QAPP, problems encountered, deviations from the QAPP, and corrective actions taken. The Contractor may include this information in their monthly financial/technical progress report.
- If, during the Period of Performance of this Work Assignment, the COR provides technical direction that revisions to the QAPP are necessary, the Contractor shall follow all procedures and requirements set forth for development of the original QAPP, as specified above. The Contractor shall include a version history page that summarizes changes made. The Contractor also shall provide EPA with copies of any modified SOPs or checklists.

- All QA documentation, including the QAPP, prepared under this work assignment shall be considered non-proprietary and shall be made available to the public by the contractor at EPA's request.
- In addition to the QAPP requirements described above, all major deliverables (e.g., Technical Support Documents, Study Reports, Study Plans, etc.) produced by the Contractor under this work assignment must include a discussion of the QA/QC activities that were or will be performed to support the deliverable. The QA/QC section shall summarize the QA/QC activities performed during the project that relate to the deliverable, identify any deviations from QA protocols (e.g., from the QAPP), problems encountered and corrective actions taken, and any limitations on the usability of the data for the purposes intended.
- The Contractor shall immediately notify the COR of any QA problems encountered that may impact the performance of this Work Assignment, with recommendations for corrective action.

The Contractor shall provide the following deliverables for Task 2:

TASK	DELIVERABLES	DUE DATE TO EPA
Task 2: Develop and comply with a QAPP	A draft QAPP (or draft revisions to the existing QAPP, if needed) to EPA for internal review and vetting.	In accordance with contract requirements.
	Final draft of QAPP.	Within 5 business days of receiving EPA's written comments on draft QAPP.
	Final QAPP deliverables.	Within 3 business days of receiving EPA's written comments on final draft.

Task 3: Create an inventory of publicly available studies on the economic impacts of trash in the aquatic environment and the potential economic benefits of programs to prevent and reduce trash loadings into freshwater and coastal ecosystems.

The Contractor shall review and compile publicly available data sources for information on the economic impacts of trash in the aquatic environment and the potential economic benefits of programs to prevent and reduce trash loadings into freshwater and coastal ecosystems. Publicly available data sources may include, but are not limited to, government reports produced by Federal, regional, state, and municipal agencies; reports prepared by national non-governmental organizations such as the Ocean Conservancy, and by state and local non-governmental organizations such as the Anacostia Watershed Society; reports prepared by business organizations and individual businesses; and reports prepared by academic entities. Studies do not have to be peer reviewed to be relevant. The Contractor shall not utilize data sources created prior to 2005, unless in their judgment a pre-2005 data source provides relevant information that addresses the objectives of this project.

The Contractor shall list and *briefly* summarize the primary economic findings of these reports, utilizing a format and level of detail that is developed in consultation with the COR.

Primary economic findings shall include, but are not limited to, the costs of trash management programs (e.g., collection, clean-up, screening devices, education); the impacts of aquatic trash on state and local economies (e.g., impacts on tax rates and lost revenue/increased expenditures for business sectors such as tourism, recreation, and transportation); and the relative costs savings (if any) of prevention and reduction programs in comparison with status quo clean-up efforts.

The Contractor shall generate a summary document which identifies the publicly available studies and summarizes the relevant findings of those studies. The Contractor shall develop the format and elements of the summary document in consultation with the COR.

The Contractor shall consult with the COR periodically as work proceeds with Task 2, including the identification of data sources to be included in the study, and shall share preliminary findings. Any changes in the scope or content of the research required for this task shall be developed in full consultation with the COR and implemented by means of a technical amendment to this PWS.

The Contractor shall provide the following deliverables for Task 3:

TASK	DELIVERABLES	DUE DATE TO EPA
Task 3: Create an inventory of publicly available economic studies of aquatic trash costs and benefits.	Research plan and preliminary report format for this Task.	August 30, 2013
	Listing of publicly available studies that have been identified for inclusion in the report for this Task.	September 15, 2013
	Draft summary document in the agreed-upon format that identifies available data sources and primary economic findings from those sources.	TBD
	Final summary document in the agreed-upon format that identifies available data sources and primary economic findings from those sources.	TBD

Task 4: Analyze the information assembled in Task 3 and develop a set of economically credible conclusions on the aggregate costs associated with trash pollution *and* the economic benefits of proactive trash prevention at the national, regional, state, and municipal levels.

The Contractor shall conduct an analysis of the publicly available information on the economic impacts of trash in the aquatic environment and the potential economic benefits of programs to prevent loading of trash into freshwater and coastal ecosystems. The analysis

shall seek to determine the aggregate costs associated with trash pollution *and* the economic benefits of proactive prevention at the national, regional, state, and municipal levels.

Analysis of costs and benefits shall include, but are not limited to, the costs of trash management programs (e.g., collection, clean-up, screening devices, education); the impacts of aquatic trash on state and local economies (e.g., impacts on tax rates and lost revenue/increased expenditures for business sectors such as tourism, recreation, and transportation); the relative costs savings and return on investment (if any) of prevention and reduction programs in comparison with status quo clean-up efforts.

The Contractor shall calculate, where possible, total aggregated costs and benefits at the national, regional, state, and municipal levels; average costs and benefits for specific practices and/or levels of government; and potential costs savings for different activities calculated from data obtained from studies identified in Task 2.

The Contractor shall use all applicable economic methodologies to conduct the requisite analysis under this task, including but not limited to consolidation of data from multiple studies and the extrapolation of available data using modeling and other techniques.

The Contractor's analysis shall identify data gaps and additional analytical opportunities where credible conclusions cannot be drawn.

The Contractor shall present analytical findings in a white paper report, with the specific organization and format of the white paper to be determined after prior consultation with the COR.

The Contractor shall not release data or environmental information without prior approval of the COR.

The Contractor shall provide the following deliverables for Task 4:

TASK	DELIVERABLES	DUE DATE TO EPA
Task 4: Analyze the costs of aquatic trash and the benefits of trash prevention programs.	Analytical plan and preliminary report format for this Task.	TBD
	Draft white paper report in the agreed-upon format.	TBD
	Final white paper report in the agreed-upon format, including a QA report.	TBD

7. General Requirements:

- Delays: The Contractor shall notify the COR in advance if a due date will not be met and shall request a new due date.
- Draft Documents: The Contractor shall submit draft documents for COR's review. Draft documents shall be provided in both hard copy and electronic format, with specific

formatting subject to approval by the COR. The COR will provide comments on draft documents prior to submission of final documents.

- **Final Documents:** The Contractor shall submit final documents in both hard copy and electronic format, with specific formatting subject to approval by the COR.
- **Consultants and subcontractors:** The Contractor shall provide the EPA Contracting Officer with signed copies of all consultant and/or subcontractor agreements for work required to be done by experts not directly employed by ERG (if any).
- **Monthly reports:** The Contractor shall provide monthly progress reports to the COR with information on progress toward completion of deliverables, issues that have been identified during the course of the work (including QA issues), newly identified opportunities to improve the project, and expenditure of available resources.
- **Funding expenditure notification:** The Contractor shall notify the COR when 85% of the allocated funds for this project have been expended.

8. Travel: Any travel chargeable to this Performance Work Statement shall be allowable only in accordance with the limitation of FAR 31.205-43 and FAR 31.205-46, and must be approved by the EPA Project Officer prior to travel taking place.

9. Contractor Identification: Contractor personnel shall clearly identify corporate affiliation at the start of any meeting. While attending EPA-sponsored meetings, conferences, symposia, etc. or while on a Government site, Contractor personnel shall wear a badge which identifies the individual as a contractor employee. Contractor personnel are strictly prohibited from acting as a representative of the Agency at meetings, conferences, symposia, etc.

10. Confidentiality: In the event that any work assigned under these tasks involves the handling of confidential governmental or business information, the Contractor shall follow all mandatory procedures for handling such information and shall not disclose any such information to the public.

11. Prohibition of inherently governmental activities: Contractor activities under this Performance Work Statement shall be strictly limited to providing analysis and recommendations with regard to technical and programmatic issues. The Contractor shall not engage in activities of an inherently governmental nature, such as the following:

1. Formulation of Agency policy;
2. Selection of Agency priorities;
3. Development of Agency regulations.

Should the Contractor receive any instruction from an EPA staff person that the Contractor ascertains to fall into any of these categories or goes beyond the scope of the contract or the

Performance Work Statement, the contractor shall immediately contact the Project Officer or the Contracting Officer.

12. Guidance Regarding Conferences: No single event under this Work Assignment is anticipated to exceed \$20,000. The Contractor shall immediately notify the EPA Contracting Officer, PO and WAM of any anticipated event involving support for a meeting, conference, workshop, symposium, retreat, seminar or training that may potentially incur \$20,000 or more in cost during performance. Conference expenses are all direct and indirect costs paid by the government and include any associated authorized travel and per diem expenses, room charges for official business, audiovisual use, light refreshments, registration fees, ground transportation and other expenses as defined by the Federal Travel Regulations. All outlays for conference preparation should be included, but the federal employee time for conference preparation should not be included. After notifying EPA of the potential to reach this threshold, the Contractor shall not proceed with the task(s) until authorized to do so by the Contracting Officer.

EPA United States Environmental Protection Agency Washington, DC 20460 Work Assignment						Work Assignment Number 0-50				
						<input type="checkbox"/> Other <input type="checkbox"/> Amendment Number:				
Contract Number EP-C-12-021			Contract Period 09/26/2012 To 09/25/2014 Base <input checked="" type="checkbox"/> Option Period Number			Title of Work Assignment/SF Site Name Managing Trash and Debris				
Contractor EASTERN RESEARCH GROUP, INC.					Specify Section and paragraph of Contract SOW See PWS					
Purpose: <input checked="" type="checkbox"/> Work Assignment <input type="checkbox"/> Work Assignment Close-Out <input type="checkbox"/> Work Assignment Amendment <input type="checkbox"/> Incremental Funding <input checked="" type="checkbox"/> Work Plan Approval						Period of Performance From 07/30/2013 To 09/25/2013				
Comments:										
<div style="display: flex; justify-content: space-between;"> <input type="checkbox"/> Superfund Accounting and Appropriations Data <input checked="" type="checkbox"/> Non-Superfund </div>										
Note: To report additional accounting and appropriations data use EPA Form 1900-69A.										
SFO (Max 2) <input type="checkbox"/>										
Line	DCN (Max 6)	Budget/FY (Max 4)	Appropriation Code (Max 6)	Budget Org/Code (Max 7)	Program Element (Max 9)	Object Class (Max 4)	Amount (Dollars)	(Cents)	Site/Project (Max 8)	Cost Org/Code (Max 7)
1										
2										
3										
4										
5										
Authorized Work Assignment Ceiling										
Contract Period:		Cost/Fee: \$0.00				LOE: 0				
09/26/2012 To 09/25/2014										
This Action:		\$39,990.00				434				
Total:		\$39,990.00				434				
Work Plan / Cost Estimate Approvals										
Contractor WP Dated: 08/08/2013		Cost/Fee: \$39,990.00				LOE: 434				
Cumulative Approved:		Cost/Fee: \$39,990.00				LOE: 434				
Work Assignment Manager Name Robert Benson <div style="display: flex; justify-content: space-between;"> <div>_____ (Signature)</div> <div>_____ (Date)</div> </div>						Branch/Mail Code: Phone Number 202-566-2954 FAX Number:				
Project Officer Name Meghan Hessenauer <div style="display: flex; justify-content: space-between;"> <div>_____ (Signature)</div> <div>_____ (Date)</div> </div>						Branch/Mail Code: Phone Number: 202-566-1040 FAX Number:				
Other Agency Official Name <div style="display: flex; justify-content: space-between;"> <div>_____ (Signature)</div> <div>_____ (Date)</div> </div>						Branch/Mail Code: Phone Number: FAX Number:				
Contracting Official Name Brad Heath <div style="display: flex; justify-content: space-between;"> <div>_____ (Signature)</div> <div>_____ (Date)</div> </div>						Branch/Mail Code: Phone Number: 513-487-2352 FAX Number:				